

Next Week: Users Rate Their Mainframes

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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NEWSPAPER



Special NCC Preview follows Page 34.

Crowd of 80,000 Visitors Expected at Anaheim Show

ANAHEIM, Calif. — A mob of 80,000 — users and vendors alike, from the U.S. and abroad — is expected to flock here next week for the computer industry's biggest annual show — the National Computer Conference.

Sponsored by the American Federation of Information Processing Societies (Afips), NCC 1980 will offer visitors a chance to see the wares of more than 600 vendors in 1,600 booths and choose from 104 technical sessions aimed primarily at DP managers.

A preview of events, the conference session schedule, exhibits and after-the-show attractions here May 19-22 follows Page 34.

Early Registration

Because of the unusually large number of people expected — judging from preconference registration — Afips will host an additional early registration opportunity — a party Sunday at the Convention Center from 6 p.m. to 8 p.m. Those who register Sunday night will avoid the crunch when the doors open at 7:30 Monday morning, Afips officials said.

Attendance of only 57,240 two years ago swamped the registration desks — hence the additional registration efforts, Afips added.

Equipment will be on display in the Convention Center here, and in two covered, air-conditioned parking areas and at the nearby

Disneyland Hotel. The hotel will house the Personal Computing Festival as well as some last-minute exhibitors who could not be accommodated in the main hall, Afips said.

Buses will shuttle attendees between the Convention Center and the Disneyland Hotel as well as to and from all the other official Afips motels from 7:00 a.m. until 7:00 p.m., Afips said.

Technical Sessions

As for technical sessions, conference planners — stung by criticism of last year's poorly attended program — have made an effort to "improve" and "streamline" the program this year, according to Program Chairman Don Medley. This year's schedule contains only 104 sessions compared with last year's 155.

By dropping some of last year's weakest session topics and combining the best material and best speakers, Medley thinks conference organizers have created some strong sessions that should draw good crowds.

"The vast majority of our sessions in Anaheim will focus on the usability of computers as tools," Medley said.

"We tried to look at every session and ask ourselves 'How will this be of help to users, whether they're DP professionals or people working in engineering or accounting?'" he said.

The 100 or so topics that appear on the conference schedule (see Page NCC Preview/6) include programming languages, software engineering, the role of minicomputers and microcomputers in distributed processing, the expected impact of very large-scale integration, DP auditing, transborder data flow and office automation.

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IBM Adds Double-Throughput 4331

By Tom Henkel

CW Staff

WHITE PLAINS, N.Y. — IBM last week released a mid-range version of its 4331 processor that offers doubled throughput, a doubled price tag and four times the main memory of the

original 4331.

Called 4331 Model Group 2, the release consists of 1M-, 2M-, 3M- and 4M-byte models. The machines are also said to offer between 1.8 and 2.3 times the throughput of what IBM is now calling the 4331 Model Group 1, the earlier two-model line offering 512K and 1M bytes of main memory, respectively.

Said to be the long-awaited missing link in the 4300 line, the Group 2 is the first 4300 CPU to offer high-speed buffer storage — 8K bytes. It also appears to be the first 4300 to operate in an IBM 370 mode without performance degradation.

In addition to accepting the 4300's DOS/VSE operating system, Group 2 will operate in 370 mode using the OS/V51 operating system. That feature will give users with 4331 Group 2 CPUs running with 370s a multiple system advantage, IBM said.

Conversion Kits

Existing 4331 CPUs are field-upgradable to Group 2 models via some board switching, a process said to take 13 to 16 hours. IBM also emphasized that it

will keep any boards it removes from existing 4331s.

The first Group 1-to-Group 2 conversion kits are expected to be shipped in the third quarter of 1980 with complete Group 2 systems being shipped

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Users Try to Total Savings From Structured Methods

By Rita Shoor

CW Staff

LONG GROVE, Ill. — Is it possible to come up with specific dollar amounts to reflect the cost savings when a system is developed using structured methodology? The answer from two insurance companies is "not yet."

In late 1976, programmer/analysts at Kemper Insurance here utilized structured techniques to rewrite a statistical validation system. The original programs, written in Cobol that had been converted on a line-for-line basis from 7074/Autocoder, were extremely difficult to maintain because of their "twisted spaghetti logic," according to

Jim Nowlen, a DP supervisor.

Among the tools used during the re-writing process were Hierarchical Input Process Output (Hipo) diagrams. In addition, diagrams were developed for each of the approximately 100 programs in the new system. The program Hipo structures showed the input, the program's major functions written in pseudo-code and output from the program.

Programming standards included a requirement for a mainline in each module and the elimination of unnecessary GOTO statements. GOTOs were only permissible in a downward

(Continued on Page 6)

CCIA Appeals FCC Decision In Inquiry II

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — A few hours after the Federal Communications Commission (FCC) released the full text of its "final" decision in the Second Computer Inquiry, the Computer & Communications Industry Association (CCIA) asked the U.S. Court of Appeals to review it.

Meanwhile, the Independent Data Communications Manufacturers Association was preparing a petition in which it — and possibly the Association of Data Processing Service Orga-

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Exxon 'Supercontroller' Weds Data, Voice At Up to 56K Bit/Sec Over Standard Lines

By Brad Schultz
 CW Staff

DETROIT — Users can integrate data and voice communications at up to 56K bit/sec over standard telephone lines with a digital switching system that an Exxon Enterprises, Inc. affiliate is presenting this week at the International Communications Association convention here.

No modem is needed at any DP workstation for the user of Intecom, Inc.'s Series 40 Integrated Business Exchange (IBX/S40) to handle asynchronous and synchronous data calls in the 110- to 56K bit/sec range, a spokesman claimed. And the user may simultaneously field voice traffic while processing data flows.

The IBX/S40 joins an emerging class of integration-oriented switching systems, sometimes called "supercontrollers," that allow large organizations to establish communications between DP, word processing, electronic mail, video and voice equipment under a wide range of protocols.

Supercontrollers will appear in two forms, an Intecom official said. Those like the IBX/S40 will address the user's local environment, managing information flows to and from network facilities within a single building or complex of adjacent buildings. Other supercontrollers will administer flows throughout the network, he said, rendering services accessible to all authorized nodes.

More Than a Data Switch

As much more than simply a data switch, the IBX/S40 employs packet-switching techniques to translate communications protocols and convert data formats, the Intecom spokesman said. That reportedly frees the user

from dependence on the data communications offerings of a particular vendor — a sore point with users that want to consolidate control over far-flung and increasingly complex facilities.

Besides supporting the packet services of GTE Telenet Communications Corp. and Tymnet, Inc., the Series 40 and future IBX systems will accept the services of major carriers such as AT&T, Western Union Telegraph Co. and RCA Global Communications, Inc., the spokesman stated.

IBX systems will also fit the satellite offerings planned by Xerox Corp. and Satellite Business Systems, he added.

The IBX architecture is said to feature a nonblocking switching matrix and redundant Perkin-Elmer Corp. 32-bit central processors, each storing up to 4M bytes of data. These processors coordinate the functions of up to 16 distributed subsystems that Intecom calls switching partitions (SP).

Equipped with the Z-80 microprocessors turned out by another Exxon affiliate, Zilog, Inc., the SP provides 256 interface ports for communications with CRT terminals, printers, telecopiers, facsimile units and other peripherals at rates as fast as 128K bit/sec. That comes to a total of 4,096 ports per IBX/S40.

Other devices from Intecom digitally encode voice at the user's workstations. This Integrated Terminal Equipment can multiplex voice flows with data flows through RS-232C and RS-449 interfaces and route the integrated bit streams over twisted pair wires to the nearest SP. To a distance of more than one mile, SPs can be interconnected by laser-driven optical fiber cables, the spokesman noted.

The Intecom switching system's data-oriented capabilities, which in-

clude pooling of controller-level modems, echo suppressor control and bit transparent transmission, are joined by a number of sophisticated voice-only features, the vendor's spokesman continued. These include uniform alternate routing and queuing, call detail recording, directory lookup and direct inward dialing.

Reliability Enhancers

Apparently aware that a supercontroller "crash" would wipe out all communications entrusted to its care (CW, April 21), Intecom has written an arsenal of reliability-enhancing features into the basic IBX design.

According to the vendor, the design has "extensive" hardware redundancy with automatic activation of backup components, uninterruptible power supplies and fault-detection and trunk-utilization analysis to pinpoint the cause of outages.

Many of the IBX diagnostic capabilities can be run remotely, the spokesman said, cutting the user's need for field service.

Founded in 1978, Intecom came under the control of Exxon Enterprises, Exxon Corp.'s holding company for venture capital operations, last year. The Dallas-based firm plans to sell, install and maintain the IBX/S40 on a direct basis to the end user when deliveries begin in 1981, the spokesman noted. There are now 14 other DP vendors in Exxon Enterprises' Information Systems Division.

A 1,000-line IBX/S40 configuration costs between \$800 and \$1,000 per line, which is about the same as the cost of 1,000-line voice-only switching systems, the Intecom spokesman maintained. Intecom is at 16509 Addison Road, Dallas, Texas 75240.

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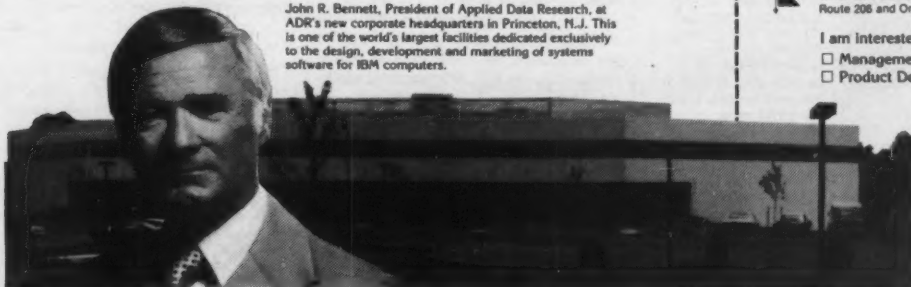
A message from John R. Bennett,
President, Applied Data Research,
to firms considering DB/DC systems.

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John R. Bennett, President of Applied Data Research, at ADR's new corporate headquarters in Princeton, N.J. This is one of the world's largest facilities dedicated exclusively to the design, development and marketing of systems software for IBM computers.



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Falloff in Orders Shortens Waits for 4331s

By Tom Henkel
CW Staff

WHITE PLAINS, N.Y. — The mob waiting for IBM 4331s has dwindled into a more manageable crowd — resulting in faster deliveries of that processor.

Delivery dates for the 4331 have been cut by six months to one year, apparently because of stepped-up production on IBM's part and a larger than normal falloff in orders, prospective users of the system said last week.

Originally the overwhelming influx

of orders for the unit — reportedly for more than 35,000 units — resulted in lead times of several years for delivery.

However, IBM said it can now give new customers delivery dates ranging from three months to a year, and some users said they have been able to cut

their prospective delivery dates by up to a year from the originally announced dates.

Moreover, the delivery improvements are likely to affect the larger 4341 in the near future, according to David Stein, an analyst for the Gartner Group, Inc., a long-time IBM watcher.

Some users reported IBM has already bent its 4341 delivery schedule for the sake of preserving an existing order. However, the firm has not formally announced improved delivery schedules on that machine.

The fact that IBM can speed its delivery schedule can be traced to several factors. First, it is not unusual for a large block of first-day orders to dwindle as potential users reevaluate their needs, Stein said. Besides the normal turnaround in orders, the 4331 is experiencing additional turnaround from users in remote sites which are finding the 4331 too difficult to install and maintain for inexperienced DPers, Stein added.

In addition, IBM has apparently shifted its 4300 assembly lines into high gear, turning out about 1,000 systems in the first quarter of 1980, Stein estimated.

For the 4341, the cause is apparently simple: IBM has stepped up production of 64K random-access memory (RAM) chips, Stein said.

IBM had been holding back on the number of 4341s it released because early CPUs were produced using 16K RAM chips rather than the 64K chips specified. Now, if IBM has in fact improved its 64K chip supply, it can go ahead and produce those machines at full steam, Stein noted.

Users Not Ready

Although 4331 delivery improvements are apparently available for the asking, many DPers said they are not ready for an earlier delivery. A sagging economy and user delays in converting software to the 4300's operating system seem to be the major reasons. Of 14 prospective 4331 users contacted last week, a majority were not interested in delivery improvements.

Six users said they will stick with their original delivery dates. Two others said they have delayed delivery from the original date (six months in one case and a year in the other). Two users had canceled 4300 orders.

Of the 14 contacted, only two said they will definitely take the improved delivery date. For Swedish American Hospital in Rockford, Ill., news of the improved delivery came somewhat as a surprise. The hospital's DP manager, Alan Hamon, said IBM notified him his delivery was being stepped up from August 1981 to June 1980.

Hamon, however, was not ready to accept a 4331 that early and asked IBM to restore his original delivery date. IBM complied with his request.

One 4341 customer with a March 1981 delivery mentioned to IBM he was seriously looking at National Advanced Systems' AS/5000 as an alternative system. The customer's DP manager said IBM improved his 4341 delivery by three months to December 1980, and promised an even greater improvement when he signed a contract.

The DP manager said he decided to take the AS/5000, however, because it offered a better price/performance.

IBM Brings Out Mid-Range 4331

(Continued From Page 1)

in the fourth quarter, according to IBM.

In addition to doubling throughput, IBM also doubled the amount of microcode necessary to run the system. Group 2 models require 131K bytes of reloadable control storage, whereas Group 1 CPUs require 65K. A Control Storage Expansion feature to accommodate the increased microcode requirement is available for field upgrade. Group 2 processors also require 12K bytes of read-only control storage, IBM said.

Without the Control Storage Expansion feature, main memory will be cut by at least 53K bytes. With the feature, main memory will be cut by 16K bytes, IBM said.

Group 2 offers an optional high-speed block multiplexer channel with a

maximum data rate of 1.56M byte/sec. Users can also get a second multiplexer channel with a maximum data rate of 1.25M byte/sec. This means Group 2 users can attach IBM 3330, 3340 or 3344, 3350 and 3370 disk drives via 3830 or 3880 control units, IBM said.

Improved Throughput

Although IBM said its Group 2 processors offer up to 2.3 times the throughput of Group 1 — in a batch mode under DOS/VSE with the VSE/Advanced Function in an ECP5:VSE mode with 3310 or 3370 disk drives — the throughput improvement was by a factor of 1.1 to 2, IBM said.

By taking into consideration the higher degree of multiprogramming on Group 2 CPUs, in tests with approximately equal CPU utilization Group 2 processors averaged a 1.8 improve-

ment over Group 1, IBM noted.

However, when similar tests were made with 3340 disk drives in place of the 3310s or 3370, "throughput did not exceed a factor of 1.4 even in the case of higher multiprogramming," IBM said.

In an on-line environment under CICS/VSE, the throughput improvement is expected to be 1.8 times that of Group 1 processors. Response time will remain the same, IBM said.

Group 2 CPUs also have a provision for an additional optional direct access storage device (DASD) adapter that will allow users to attach up to four 3310 or 3370 disk drives or two 3340 drives, IBM said.

The Model Group 2 1M-byte model costs \$150,000 or \$4,285 on a two-year lease; the 2M-byte model costs \$165,700 or \$4,685 on a two-year

IBM SYSTEM	370/125-2	4331 Group 1	4331 Group 2	370/148	4341	370/158-3	3031
CHARACTERISTICS							
Relative Performance ¹	6.3	11	22	24	37	45	54
Memory Size in Bytes (Minimum to Maximum)	96K-512K	512K-1M	1M-4M	1M-2M	2M-4M	512K-6M	2M-6M
Purchase Price (Memory Size)	\$169,610 (512K)	\$76,000 (1M)	\$150,000 (1M)	\$438,750 (1M)	\$257,250 (2M)	\$1,609,500 (1M)	\$664,000 (2M)
Monthly Lease (Lease Term)	\$6,545 (4 Years)	\$1,895 (2 Years)	\$4,285 (2 Years)	\$19,390 (4 Years)	\$6,390 (2 Years)	\$48,350 (4 Years)	\$23,940 (4 Years)
Memory Cycle Time (Nsec)	320-480	1,300 (Per 4 Bytes)	Not Available	405-540	714 (Per 4 Bytes)	690-1,035	345
Machine Cycle Time (Nsec)	480	900 (Per 4 Bytes)	Not Available	180-225	150-300	115	115
Channels (Minimum to Maximum)	1	0-2	0-2	5	3-6	0-6	6
Cache (Buffer) Size	None	None	8K	None	None	16K	32K
Bus Architecture?	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	Not Available	Not Available	\$15,700 ³	\$50,000	\$31,400 ³	\$50,000	\$50,000
¹ Relative throughput based on the IBM 370/158-3's equalling 45. Performance based on manufacturers' claims. ² Price for an upgrade from the 1M- to 2M-byte model is \$15,500. ³ Price for a 2M-byte increment. Price for 1M-byte increase not available.							

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lease; the 3M-byte CPU costs \$181,400 or \$5,085 on a two-year lease; and the 4M-byte unit costs \$197,100 or \$5,485 on a two-year lease, according to IBM.

A field upgrade package (including the Control Storage Expansion option) for a 512K-byte 4331 to a 1M-byte Group 2 costs \$76,395; an upgrade to the 2M-byte model costs \$92,095; an upgrade to the 3M-byte model costs \$107,795; and the 4M-byte field upgrade costs \$123,495, IBM said.

For a field upgrade from a 1M-byte Group 1 model to a 1M-byte Group 2, cost is \$68,545; a 2M-byte upgrade costs \$84,245; the 3M-byte field upgrade costs \$99,945; and the 4M-byte upgrade is \$115,645. Prices include the Control Storage Expansion option, IBM said.

DEC Enhances VAX-11/780 Operating System

By Marcy Rosenberg

CW Staff

MAYNARD, Mass. — On the heels of Data General Corp.'s entry into the 32-bit superminicomputer arena last week [CW, May 5], Digital Equipment Corp. introduced an enhanced version of its VAX-11/780 processor's operating system and two 32-bit languages.

Added to DEC's existing line of 32-bit languages — Cobol, Fortran, Bliss-32 and Pascal — were Basic and Coral 66 compilers that produce 32-bit object code, according to a company spokesman. Fortran-77 and an extended version of Ans Cobol-74 were also introduced for the VAX.

Along with a beefed-up 32-bit Cobol, the firm extended data retrieval and forms generation capabilities with its new version of the VAX/VMS operating system — offerings the spokesman admitted were designed to make the VAX more attractive to commercial users.

Version 2 of the VAX/VMS virtual memory operating system now can support up to 4M bytes of MA780 multiport memory, 8M bytes of local memory and DEC's DR780- high-speed interface, he claimed. It also extends Unibus support to the firm's RX02 floppy disk unit.

And by extending to the VAX the Forms Management System (FMS) originally developed for PDP-11 processors, DEC claimed to offer improved forms generation capabilities on the 32-bit machine.

VAX-11 FMS is said to allow users to create and modify forms interactively, with screen formatting routines callable from standard VAX languages including Cobol, Fortran and Basic. Including a HELP facility, the FMS package can be used to validate application data and scroll for large forms, the spokesman indicated.

Data Retrieval

To improve data retrieval capabilities, DEC brought out a new version of its Datatrieve inquiry, data maintenance and reporting language that reportedly provides access to the VAX RMS file management system, variable length record support and single inquiry access to multiple files.

Also added in VAX/VMS Version 2 were an interactive editor called EDT, with keypad editing and automatic journaling facilities; a message utility; new system tuning and disk protection features; encrypted passwords for security; and an upgrade utility for conversions from earlier versions of the operating system.

In addition, network command terminal capability added to Decnet-VAX software lets users log on to remote VAX systems as if directly connected to those systems, the spokesman added.

Extended Cobol, Fortran, Basic and Coral 66 language compilers are said to provide access to such VAX/VMS utilities as the symbolic debugger, runtime library of sharable routines, RMS with multikey Isam, as well as transparent access to Decnet communications software.

Cobol Compiler

Now capable of 3,000 line/min compilation speeds, VAX-11 Cobol-74 supports nine modules at Level 2 implementation. They are nucleus; table

handling; sequential, relative and indexed I/O; segmentation; library; interprogram communication; and Sort-Merge, which was just added.

Previously, library and interprogram communication modules were implemented at Level 1, the spokesman said.

The enhanced Cobol language processor is said to produce source language listings with embedded diagnostics that indicate line and position of errors. It supports, in addition, numeric display and computation data types plus signed and unsigned packed decimal, floating point and alphanumeric display data.

VAX-11 Fortran, DEC's first full implementation of Fortran-77 on the VAX system, can compile at speeds ranging from 2,000- to 3,000 line/min

and is said to be upwardly compatible with the firm's earlier Fortran-66 version called VAX-11 Fortran IV-Plus.

This latest version is said to recognize extended logical, integer and complex data types, provide statements to extend user control of file organization and access and simplify I/O data formats.

Basic and Coral 66

Introduced along with the enhanced 32-bit Cobol and Fortran compilers were DEC's first 32-bit versions of Basic and Coral 66, a British-developed real-time language derived from Jovial and Algol 60 for technical and scientific uses.

With a compilation speed of up to 3,000 line/min, VAX-11 Basic report-

edly provides improved I/O, character and matrix handling facilities. VAX-11 Coral 66 is said to offer facilities for block structuring of programs and utilizes integer, real, byte and character string data types.

Single-use license fees including support for the languages are \$12,000 for VAX-11, Cobol, \$7,000 for VAX-11 Fortran, \$8,000 for VAX-11 Basic and \$10,000 for VAX-11 Coral 66.

Normally delivered with packaged VAX hardware/software systems, VAX/VMS Version 2 can also be purchased separately for \$20,000 with support.

Deliveries will begin this summer for VAX/VMS Version 2 and the Fortran, Basic and Coral 66 compilers. VAX-11 Cobol will be available in the Fall.

Control

Are you just looking at the tip of the iceberg?

A ship's captain uses radar and sonar to avoid hidden dangers of icebergs. Like any manager, a captain knows it's the "unseen dangers" that cause the biggest problems.

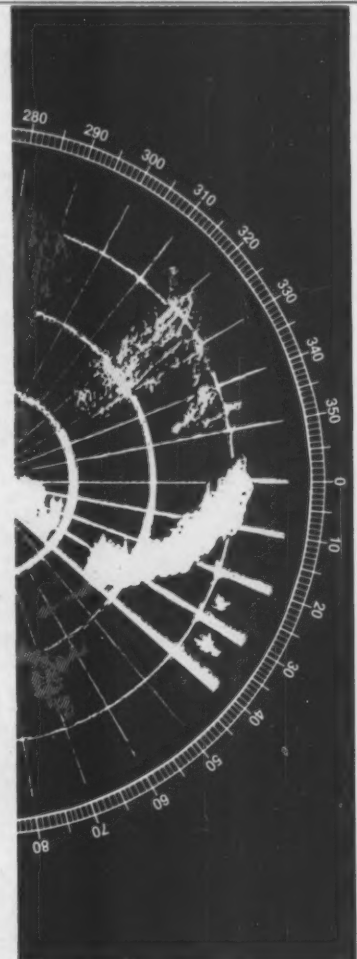
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Datapac Breach Traced to U.S. Prep School

By Brad Schultz
CW Staff

NEW YORK — Federal agents in the U.S. and Canada are looking for someone they say tampered with the computer files of subscribers to Canada's Datapac packet-switching network.

The intruder allegedly operated from the Dalton School, a prep school here, and used GTE Telenet Communications Corp.'s Telenet packet-switching network to access Datapac, according to spokesmen for the Federal Bureau of Investigation and GTE Telenet. Authorities have not yet determined whether companies were victimized within the U.S., the FBI spokesman said.

The motivation for the packet network breaches and the alleged culprit's identity remained a mystery at press time last week. But suspicions were focused on students and faculty at Dalton, where a New York Telephone Co. investigator found 42 Telenet tie-ins to have occurred since April 16 — some of them seemingly the means by which Datapac subscribers were abused, the FBI spokesman stated.

No Major Losses

Montreal-based Canada Cement La Farge was one victim, according to a spokesman for that company. The FBI and Royal Canadian Mounted Police are investigating whether recent abuses of computer facilities at the Universities of Alberta, Toronto and Waterloo and at Honeywell, Inc.'s Canadian operation, among other Data-

pac nodes, are related to the caper.

No major losses from the tampering spree have come to light so far. Canada Cement La Farge, a cement and construction materials producer, alerted Bell Canada to the trouble after noticing a pattern of unauthorized tie-ins, according to Information Systems Manager Rene d'Ollander.

The Montreal user stores copies of its data collection files in an 80M-byte reserve disk storage unit every day, d'Ollander noted, so sudden crashes of the firm's two Digital Equipment Corp. PDP-11/34 minicomputers would not destroy the files.

Holding to that policy, Canada Cement La Farge called in the Royal Canadian Mounted Police to watch as the New York assailant tampered with the files in two 80M-byte primary disk units. The files contained coded shipping, payroll and inventory information of little value to anyone but Canada Cement La Farge, d'Ollander told Computerworld.

Within an hour, a team of Mounties, FBI agents and telephone utility investigators traced the unauthorized transmissions to their source in New York, d'Ollander continued.

Canada Cement La Farge decided to keep itself open to the breaches at selected times in mid-April in order to help the authorities study the nature of the abuse and gather evidence for prosecution, the systems manager explained. However, when security features supporting the RSTS/E operating system were tightened, the assail-

ant apparently became angry and suddenly erased some 10 million bytes from the dual-processor configuration's primary disks.

The Dalton School uses computer facilities to teach its college-bound students, according to an informed source. But a school official refused to confirm that statement, identify the facilities or comment on reports that Dalton does not even subscribe to Telenet or Datapac.

'Annoyance Complaint'

After learning from GTE Telenet of the telecommunications abuse, New York Telephone Co. treated the matter

as an "annoyance complaint," a spokesman for the utility said. A New York Tel investigator, Frederick Fisher, pinpointed four telephone ports at the Dalton School as the source of the mischief; soon afterward, a U.S. district court judge granted the FBI a search warrant.

On April 25, agents seized "computer-related paper materials" on the Dalton premises that are now held as evidence in the case.

Whoever is responsible for the packet network tampering faces up to five years' imprisonment and up to \$1,000 in fines under a federal wire fraud statute.

Users Try to Define Savings

(Continued From Page 1)

direction and had to be contained within performed routines.

The programmer/analysts also attempted to make each subroutine removable from the module without affecting any other code, although "it didn't always work out," Nowlen said.

The original time estimate for rewriting the application was 15 months, but it took about 19 people three years to implement the entire system.

However, "the 15-month estimate may not have been valid," Nowlen said, because it was developed on the basis of one routine in one program which was "below average" in terms of complexity.

Based upon one particular type of change typically requested from a user department, a time saving of 50% to 75% was recorded when comparing the structured system to the former "spaghetti logic."

However, Bishop noted, "this drop in turnaround time only lasted about two months." The time requirement has since gone up to a point where it is higher than it was on the original system.

The increase may be a result of changes in the shop standards for the entire programming area, he said. "Unless you keep the environment stable, you end up spending as much or more time [maintaining the system] because the quality improves and more testing is done."

Cost/Benefit Figures

While Kemper personnel have not generated cost/benefit figures for this system in terms of dollars, Bob Bishop, project leader, presented statistics on system maintenance in a report titled "Restructuring the Daily Validation System" at a Guide meeting in November 1979.

Bishop speculated that the company might eventually be able to demonstrate that structured methodology is cheaper in real dollars. The number of "bugs" reported in the system has decreased about 60% from an average of 10 per month in 1977 to approximately four per month reported during the first four months of 1979.

This decrease has enabled a relatively inexperienced project team (average work experience of 16 months) to reduce the backlog of new user requests from more than 75 in December 1979 to "about 30" after the first quarter of 1980.

Therefore, system maintenance may be completely handled by less experi-

enced programmers with lower salary requirements in the future.

The difficulty of quantifying the benefits of using structured techniques to develop a system was also stressed by Tony Marino, currently manager of manufacturing operations at Wang Laboratories, Inc.

Marino, formerly a manager for DP Group Systems at John Hancock Mutual Life Insurance Co. in Boston, was involved in developing several new system applications there using structured methodology. In 1977, the first system to be written with these techniques was a district manager compensation system.

"We considered ourselves pioneers in this area," Marino recalled. The group used the chief programmer/team approach with three to four programmers and one program librarian on each team.

Although Hipo charts were utilized in the initial phase, they were eliminated on later projects in favor of data flow diagrams for each program.

There was "a lot of resistance, mostly visible in DP from programmers and project leaders," Marino stated. However, this was overcome by in-house training at Hancock's Education Center with a special series of classes including some on techniques developed by Edward Yourdon of Yourdon, Inc.

"It's hard to quantify whether [the new system] was better in terms of real substance," Marino acknowledged. Bugs are easier to find and changes are easier to make but "since you don't develop the same system twice, how do you know if the 'traditional' system would be different?"

Intangible benefits which may have contributed to the organization's decision to continue using structured techniques included "forced" cross-training among the DP staff, an improved awareness among more people of how requests for changes would really affect the system and increased communication between users and the DP staff.

Corrections

In "Major Offerings in Key-to-Disk Data Entry" [CW, April 28] Infocore, Inc.'s Cobol-like language was erroneously referred to as Kobol, which is actually the name of Pertec Computer Corp.'s keystation-oriented interactive terminal language. The correct name is Ideal.



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Kickbacks Reported Near \$50,000 Bribery Alleged in Calif. DP Contract Awards

By Jeffrey Beeler

CW West Coast Bureau

PALO ALTO, Calif. — Law enforcement authorities expect to bring charges later this month against the former DP manager of nearby San Mateo County for allegedly accepting nearly \$50,000 in bribes and kickbacks from four local programming and data entry firms.

Inspectors with the county district attorney's office are investigating the possibility that George E. Vandermate asked for and received the kickbacks in return for his guarantee that the four companies would win fat contracts from the county's DP department, according to Donn Ferrero, chief investigator for the San Mateo County District Attorney's Office.

The details of Vandermate's alleged kickback scheme are contained in a series of affidavits filed last month in both Santa Clara and San Mateo County Municipal Courts. Although the affidavits show Vandermate to be under investigation for "bribery, perjury and influencing a governmental decision with a financial interest," they stop short of formally charging him with any wrongdoing. Official charges are not expected to be brought against the DP manager — and possibly others — until late May, Ferrero said.

Vandermate's San Mateo County superiors dismissed him early last month from his \$38,000/year job as head of the county's computing operations, a post he held since September 1978.

Vandermate was reached last week by phone but he declined to comment on the case.

District Attorney Contacted

Vandermate's alleged kickback scheme first came to light late last January, when Ferrero was telephoned by Frantz Theard, owner of the Sunnyvale-based keypunch data entry firm known as Theard and Associates. Theard told Ferrero that in September 1977 he and his family began an extended stay in Haiti and when he returned, he noticed several unexplained irregularities in his company's financial records, according to the affidavits.

Subsequent investigation revealed that shortly after Theard's departure from the U.S., his firm experienced a sharp rise in DP contracts from the Santa Clara County computer department, which at the time was headed by Vandermate.

Then, in late 1978, Vandermate left his job with Santa Clara County to take a similar position with San Mateo County. Shortly after, San Mateo sharply boosted its contract volume to Theard and Associates, just as Santa Clara County had done earlier.

The investigation also revealed that between November 1977 and March 1979, Rene Bazan — who was managing Theard and Associates during Theard's absence — paid \$19,600 from the company's bank accounts to a local DP outfit known as Casey and Associates. At least one of the 22 checks involved in the payments to the Casey company was allegedly endorsed by a man who identified himself as George Casey.

No listing of Casey and Associates

appears anywhere in the records of either Santa Clara County's Better Business Bureau or the federal government's Small Business Administration, Ferrero purportedly found during his investigation. Nor did the company appear in any of Pacific Telephone Co.'s subscriber records.

Moreover, a recent analysis of Vandermate's handwriting samples showed they closely match the endorsements on the back of Bazan's checks, the affidavit said.

From this and other evidence, Ferrero and his colleagues have concluded that Casey and Associates was a fictitious company created by Vandermate to cloak the \$19,600 kickback he alleg-

edly received in return for ensuring that Theard and Associates got San Mateo County's DP contracts.

To further conceal the alleged kickbacks, Vandermate is believed to have supplied Theard and Associates with approximately \$20,000 worth of sub-standard punch cards for that firm's nine IBM Model 129 keypunch units, the affidavit said. The size of the shipments far exceeded the company's needs and would have taken "years" of keypunching to deplete, Theard was quoted as saying in the document.

Further investigations by Ferrero and his colleagues have uncovered evidence that Vandermate's alleged kickback scheme included three other local

DP firms. One of the suspected companies is Security Data Ltd., a competing data entry firm that Bazan helped form while still managing Theard's outfit, according to the affidavit.

The other two companies with which Vandermate allegedly established kickback-for-contract operations include the San Jose-based Advanced Program Co. (APC) and Sigmatics, Inc. of Santa Ana, Calif.

In his affidavit, Ferrero estimated APC's, Sigmatics' and Security Data's total alleged payments to Vandermate at more than \$28,000.

A spokesman for Sigmatics' San Jose branch declined comment, and Bazan could not be reached.



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CCIA Asks Court to Review Inquiry Decision

(Continued From Page 1)

nizations — will ask the FCC to reconsider its decision. The petition is likely to be submitted to the commission early next month.

The Justice Department will automatically become a party to the CCIA suit. Although its current position has not been stated, past comments to the FCC during the Computer Inquiry leave little doubt that Justice will oppose the decision.

The full text of the Computer Inquiry decision, released last week (see Page 10), is basically no different from the initial summary released last month [CW, April 14], but it did amplify a number of key points. Most significant — because it is apt to be among the most hotly debated parts of the ruling — is what the commission had to say about the separation of AT&T's "basic" and "enhanced" services.

Essentially, the FCC has decided that all the nation's telephone carriers can continue to provide basic services directly. In addition, Bell, along with General Telephone & Electronics Corp. (GTE) but not the others, will have to establish separate subsidiaries to provide enhanced services. All Bell and GTE terminal equipment will have to be marketed but not manufactured through these subsidiaries.

By March 1982, the two carriers must market all of their enhanced services and "customer-premise equipment" — i.e., terminals — through the subsidiaries. Between now and then, new enhanced services can be offered only if the subsidiary is first established. Existing enhanced services, if offered directly, can continue to be sold that way.

A basic service, according to the decision, "is limited to the common carrier offering of transmission capacity for the movement of information." Enhanced service "combines basic service with computer processing applications that act on the format, content, code, protocol or similar aspects of the

subscriber's transmitted information; provide the subscriber additionally, different or restructured information; or involve subscriber interaction with stored information." Basic services, in other words, encompass local and

Analysis

long-distance dial-up telephone service plus leased private-line offerings between compatible terminals.

Basic services can also include circuit conditioning and end-to-end error control, as well as techniques such as companding, computerized circuit switching and bandwidth compression designed to "facilitate" the movement of information through the network.

Enhanced services include on-line data processing and other services that deliver computerized communications capabilities to the end user.

Meaning of 'Separation'

In the order it released last week, the FCC explained that "separation" means the subsidiary cannot share physical space or property with an affiliated carrier if those facilities support basic transmission services. The subsidiary must have its own operating, marketing, installation and maintenance personnel and its own corporate officers, and it must use separate computers to support its services.

However, several types of sharing are allowed:

- An AT&T subsidiary, if it purchases "sophisticated equipment" from Western Electric Co. (AT&T's manufacturing arm), could obtain support services from the same source provided they were paid for "on a compensatory basis."
- A subsidiary and its parent cannot perform software work for each other, but this restriction is "not intended to preclude the subsidiary from marketing software integral to [customer-

premise equipment] obtained from affiliated entities."

"Generic software," such as an operating system developed by the parent or its affiliate — Western Electric or Bell Labs in the cases of AT&T — can also be marketed by the subsidiary, but application programs developed by the parent/affiliate cannot be.

• Joint research and development that does not involve software development and design is also permitted if "appropriate" accounting records are maintained.

"If it is determined that research and development is being performed for the subsidiary on a less than compensatory basis, further exchanges will be prohibited," according to the decision.

• Legal and other administrative services can be shared, provided costs are accurately apportioned.

• The subsidiary is left free to borrow from its parent on unspecified terms, although prior FCC approval of the capitalization plan is required. "The corporate and regulatory implications of outside financing have not been addressed in any significant detail in the course of this proceeding," the commission pointed out. "Prior to imposing such a requirement, we believe these areas deserve further exploration."

The requirement that AT&T and GTE form separate subsidiaries to market enhanced services and terminals is one of three major changes wrought by the decision. Another is the classification of services into "basic" and "enhanced" categories, and a third is the designation of data processing as an "enhanced" service.

That last change is probably the one most significant to the computer industry; if it is sustained, it will mean that AT&T can offer on-line DP despite its 1956 Consent Decree.

Damocles' Sword

Moreover, this change leaves a regulatory sword of Damocles hanging over presently unregulated vendors of computer-based on-line services.

Regarding the latter point, the decision makes it clear that while the commission has not chosen to regulate enhanced services, it retains the power to do so.

Under existing FCC rules, on-line DP service is differentiated from communications offerings. Data processing service may be offered only by non-AT&T carriers and only through separate subsidiaries. The Second Computer Inquiry's final decision, by treating DP as an enhanced service, allows Bell to offer it.

NCC to See Mob of 80,000

(Continued From Page 1)

Medley also pointed out some special features this year on "very topical" subjects, such as the role of computer simulation in solar energy and an entire series of sessions on computers in entertainment.

A series of half-day afternoon seminars ranging in subject matter from "Super Systems for the 1980s" to the "Design and Programming of Parallel Systems with Dynamic Architectures" have also been planned. These will supplement the show's professional-

development seminars, which are scheduled for the morning, Medley explained.

And again this year, a Personal Computing Festival, chaired by Lewis A. Whitaker, will be held in the Disneyland Hotel.

Featured Speakers

The keynote address, scheduled for 9:30 Monday morning, will be delivered by David Packard, chairman of the board of Hewlett-Packard Co.

Other featured speakers include John Imlay, chief executive officer of Management Science America, Inc.; Edson de Castro, president and chief executive officer of Data General Corp.; Donn B. Tatum, chairman of the board of Walt Disney Productions; and Robert T. Cowan, vice-president of C. Itoh Electronics, Inc.

Other NCC 1980 highlights include a continuous Science Film Theatre, presenting movies on computing topics and featuring "The Making of Star Wars"; Pioneer Day, which this year honors the 25th anniversary of Share, the IBM users group; and the overall Conference Reception, Monday evening from 6 p.m. to 8 p.m. in the Grand Ballroom of the Disneyland Hotel.

A four-day ticket to the NCC exhibits cost \$25 and one day costs \$10. Add the technical sessions and the price goes up to \$75 and \$25, respectively. The \$75 fee includes a copy of the proceedings.

Professional development seminars cost full-program attendees an extra \$25.

Visitors get all three days at the Personal Computing Festival as well as that program's proceedings for \$15. A one-day ticket costs \$9 and entrance to the exhibit floor for one day is priced at \$5.

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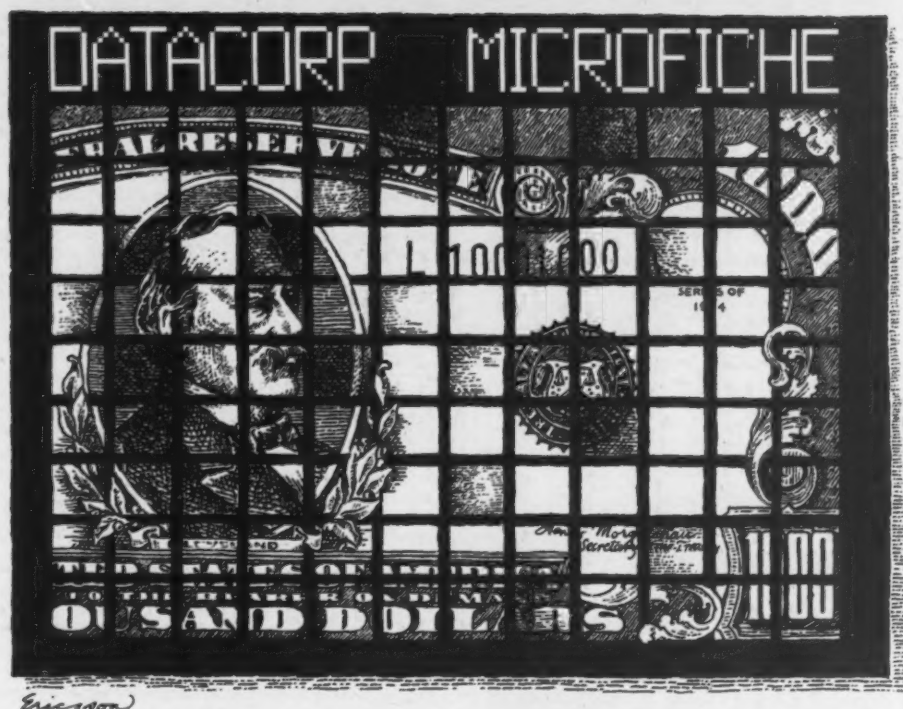
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FCC Releases Text of Second Inquiry Decision

Below are excerpts from the full text of the Federal Communications Commission's (FCC) Final Decision in the Second Computer Inquiry. Preceding each excerpt is a number identifying the related paragraph or footnote in the decision.

"10. We find that the public interest would not be served by classifying [customer-premises equipment (CPE)] based on whether more than a basic media conversion function is performed. We conclude that, in light of the increasing sophistication of all types of CPE, and the varied uses to which CPE can be put while under the

user's control, it is likely that any given classification scheme would impose an artificial, uneconomic constraint on the design and use of CPE.

"In general, no regulatory distinction should be made between various types of carrier-provided CPE."

"12. Weighing the public interest ... and the economic trade-offs inherent in a separate subsidiary requirement, we have determined that limited imposition of the requirement will best serve the communications ratepayer and the public interest."

"Because we have the flexibility under the Communications Act to adjust

the balance as circumstances change or additional evidence is brought to light, we opt for a solution in which only AT&T and GTE must form separate subsidiaries to offer enhanced services or CPE. Similarly, in establishing guidelines governing the relationship of the separated entities with their affiliates, we opt for a pragmatic approach which we can adjust when and if necessary."

"83. The First Computer Inquiry was initiated in 1966. Five years later ... The Commission issued a Final Decision ... Litigation over our decisions in the First Computer Inquiry ended in 1973.

"A mere three years later, this proceeding, the Second Computer Inquiry, was initiated and now, after almost four more years, we are again issuing a final decision on issues raised by the confluence of technology in the offering of communications and data processing services. The significant difference now is that the evolution of a distributed processing environment makes the issues more complicated. ... [T]he time has come to address these matters in a manner which gives clear direction to the marketplace, but without restricting the types of services that may be offered to consumers."

"95. ... [A] basic transmission service should be limited to the offering of transmission capacity between two or more points suitable for a user's transmission needs and subject only to the technical parameters of fidelity or distortion criteria or other conditioning. Use internal to the carrier's facility, of companding techniques, bandwidth compression techniques, circuit switching, message or packet switching, error control techniques, etc. that facilitate economical, reliable movement of information does not alter the nature of the basic service."

"In the provision of a basic transmission service, memory or storage within the network is used only to facilitate the transmission of the information from the origination to its destination, and the carrier's basic transmission network is not used as an information storage system. Thus, in a basic service, once information is given to the communication facility, its progress towards the destination is subject to only those delays caused by congestion within the network or transmission priorities given by the originator."

"97. ... An enhanced service is any offering over the telecommunications network which is more than a basic transmission service. In an enhanced service, for example, computer processing applications are used to act on the content, code, protocol and other aspects of the subscriber's information."

"In these services, additional, different or restructured information may be provided the subscriber through various processing applications performed on the transmitted information ... [O]ther actions can be taken by either the vendor or the subscriber based on the content of the information transmitted, through editing, formatting, etc."

"Moreover ... an enhanced service ... may simply involve subscriber interaction with stored information ... such as in a 'mail-box' service."

"98. ... [W]e are not foreclosing enhanced processing applications from

being performed in conjunction with 'voice' service. ... [C]omputer processing applications such as call forwarding, speed calling, directory assistance, itemized billing, traffic management studies, voice encryption, etc. may be used in conjunction with 'voice' service. ...

"[However] any option that changes the nature of such telephone service is subject to the basic/enhanced dichotomy and their respective regulatory schemes. For example, voice storage or automatic call answering within the network would be enhanced services."

"Footnote 37, Page 42. ... It may be that certain low-level protocol conversions should be allowed as part of a basic service. In the near future, we will consider a Notice of Inquiry to examine in detail the implications of forbidding all protocol translation in such instances and whether the public interest requires some exceptions to this prohibition."

"110. Computer technology is increasingly removing technical limitations as to the types of enhanced services that may be offered. Yet a classification scheme which would categorize enhanced services as either communications or data processing inherently limits the types of services that an unregulated entity may offer ... Providers of data processing and other computer services acquire ... transmission facilities from ... carriers pursuant to tariff and resell this transmission capability as part of their enhanced offerings. ...

"[A]n entity which acquires the same transmission facilities from a carrier and offers a 'communications' service is presently regulated as a common carrier. ... Accordingly, a resale entity is regulated as a common carrier only if it is providing a communications service."

"111. This has significant public interest implications in terms of the types of services that may be offered ... [T]he vendor of unregulated enhanced services may not provide an enhanced 'communications' service. ... [I]ts services must be artificially structured so as to not come under our regulatory umbrella. ... To the extent services must be so structured, there is a corresponding inability to fully tailor services to consumer needs. ...

"In the final analysis, both individual consumers and society in general bear unnecessary costs where such limitations exist. This becomes even more troublesome as new markets for enhanced services open. ... While these services traditionally have been directed at the business sector, increasing attention is being focused on residential markets."

Lamar University Tied To White House

BEAUMONT, Texas — A communications link between the White House Information Center in Washington, D.C., and the National Library Information Source at Lamar University here was established recently as part of a federal effort to give the public better access to government data bases.

The Beaumont facility is maintained by Source Telecomputing Corp. and OCLC, Inc., which give more than 2,000 public libraries access to network services.

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On System/3 and Most Processors

Cost of IBM Upkeep Seen Outpacing Inflation

By Brad Schultz

CW Staff

SANTA MONICA, Calif. — Maintenance prices for most IBM mainframes and IBM's System/3 minicomputer "have increased much more than can be explained by inflationary factors," Montgomery Phister Jr. said in his recently revised "quantitative history" of DP.

Deteriorating processor reliability may explain why maintenance rates for IBM processors have shot up faster than rates for the vendor's moving-head disks, magnetic tape units and line printers, Phister wrote in the second edition of *Data Processing Technology and Economics* (Digital Press and Santa Monica Publishing Co.).

But little is known — at least outside of IBM — about the overall reliability of IBM computing equipment during the past 15 years, Phister noted. If falling reliability does not account for the soaring maintenance prices, he surmised, then two other hypotheses may explain the phenomenon: Either IBM is increasing profits on maintenance or the quality of that maintenance is declining.

All-Electronic Gear

All-electronic gear such as processors, controllers and memories actually cost less to maintain than other IBM hardware even though that cost is rising more rapidly in terms of customer engineer (CE) hourly service rates, Phister pointed out.

The second edition of Phister's book assumes an \$8/hour CE service rate and adjusts other parameters in his original cost model to reflect rate hikes since the first edition appeared in 1976.

On that basis, unit record equipment — keypunches, tabulators and other largely mechanical devices — are the most expensive IBM computing hardware to maintain. Magnetic tape units and moving-head disk drives cost about 25% less to maintain than unit record equipment, Phister concluded, but cost twice as much to maintain as all-electronic gear.

The cost of maintaining System/3s has climbed far more sharply than the general cost of living since IBM introduced that minicomputer family in 1969, Phister asserted. That conclusion is based on a comparison between average System/3 maintenance cost and the U.S. gross national product deflator — a government inflation-measuring toll — through 1978.

Phister's conclusions do not apply to the severe inflation of the past year.

To a lesser extent than System/3 maintenance, the cost of servicing IBM's 370 and 30 series has also grown faster than inflation, Phister stated. And maintenance for IBM's 1400 mainframes, a defunct series, has also outpaced inflation since they debuted in the 1960s.

According to Phister, the user of a small IBM system will tend to spend a larger percentage of the system's purchase price on maintenance than will the user of a large IBM system.

The cost of servicing IBM's moving-head disk drives has also risen faster than inflation through much of the past 15 years, but not so much as processor maintenance, Phister deter-

mined.

"However, although it seems clear that IBM maintenance prices per \$100,000 purchase price have increased much faster than inflationary factors warrant," there may be another way to look at it, Phister remarked. "One reason may be that IBM purchase prices have perhaps not kept up with inflation."

CE Overhead

By raising IBM's CE overhead, inflation may have given the vendor reason to narrow the ratio of purchase to rental prices for its systems, Phister said, noting that rental prices must cover maintenance costs. Since 1963,

the ratio has reportedly fallen from more than 50 to about 35.

Beyond what IBM does, two trends are also forcing users to spend more on maintenance, according to Phister. They are: increasing maintenance labor costs, which are an effect of general inflation, along with the scarcity of qualified technicians; and second, the rising value of subsystems at sites remote from the central DP facility.

Data Processing Technology and Economics contains 718 pages of figures, tables and commentary. The book may be ordered from Digital Press, Educational Services, Digital Equipment Corp., Bedford, Mass. 01730.

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DP Managers Seen Facing Problem of Staff Control As Stagflation Sets In

By Brad Schultz

CW Staff

IRVINE, Calif. — As the economy worsens, DP managers may find their programming staffs more difficult to control at the very time that tighter control may be desirable, a scientist concerned with the organizational aspects of DP told *Computerworld* recently.

In some ways, severe stagflation may benefit the programmer. The organizational effects of such economic turbulence tend to drive up demands on DP facilities [CW, April 14], making programmers who can tackle those demands more attractive on the job market, the Public Policy Research Organization's Walt Scacchi said.

Short of a complete economic collapse, programmers' salaries will probably continue to climb sharply over the next several years, prompting DP managers to seek more value from existing programming staffs rather than simply hire more programmers, Scacchi said.

Toward that objective, DP managers will try to give programmers a different and in many cases more diversified mix of duties than many programmers prefer. At the same time, soaring rates of salary growth and promotion — especially rewarding to specialized programmers, such as data base experts — will give programmers reason to resist imposed changes in their work roles, Scacchi pointed out.

Making Change Attractive

Confident that they can find well-paying jobs elsewhere, many programmers will leave rather than submit to such role changes unless DP managers find ways of making those changes attractive, the University of California at Irvine scientist observed.

Development work assignments may prove to be the most important point of contention, he continued. Many programmers crave systems development, which stagflation may curtail in many organizations. Maintenance and documentation duties, which are less attractive to many programmers, may dominate the set of tasks typical users are able to fund during hard times.

Hence, DP managers may need to

make maintenance, documentation and other nondevelopment tasks more attractive to programmers who prefer development. That may be more easily done at facilities undergoing major upgrades, but users tied to long-standing systems seem especially vulnerable to high turnover rates among programmers, Scacchi noted.

One user Scacchi studied underwent a 100% turnover of its DP staff in seven months. Several "generations" of programmers have tended the system operated by that user. As a result, new programmers have only the documentation built into system software available to guide their work — a precarious situation that may become more common in the next few years, he warned.

Rough economic conditions may also slow commercial users' migrations to new programming languages and software systems, the researcher continued. Conversion costs and costs associated with retraining personnel would make such changeovers unattractive to most companies with a larger reservoir of applications already written in Cobol, Fortran and Assembler.

However, scientific users, who generally seek the state-of-the-art in shopping for computing goods and services, plus first-time users, who lack previous investments in systems, may jump at opportunities to implement languages and systems that offer enhanced productivity, according to the scientist.

Software Life Cycles

Although stagflation will drive many users to buy canned software from vendors rather than developing programs in-house, the vendor packages will tend to have shorter life cycles than internally developed software, Scacchi said.

This relatively short life cycle results because vendors usually do not furnish the packages in source code form, preventing users from making fundamental rewrites in response to such changing external conditions as tax requirements. Internally developed software, on the other hand, can be readily retooled as the user's demands dictate.

Applications packages such as accounting programs that are predicated on volatile conditions will have the shortest life cycles in user libraries, Scacchi predicted. In contrast, packages with a mathematical base that is likely to remain valid through fire and flood — statistical packages, for example — may give longer service to a company than most of its DPs.

AIEE Confab Set for June

NEW YORK — "Computers in Manufacturing" will be held here June 18-20, according to its sponsor, the Computer and Information Systems Division of the American Institute of Industrial Engineers (AIIE).

The conference will address the rapid emergence of computers and DP as essential tools for every aspect of manufacturing. It will also explore the potential of integrating manufacturing data systems, planning and control systems and computer-aided design and manufacturing to improve factory and manufacturing performance.

More information is available from AIIE Seminars, Department PR, P.O. Box 3727, Santa Monica, Calif. 90403.



'So You're the New Computer Operator Now, Huh, Frank?'

In Federal Agencies

GAO Reports Little Use of New Software Tools

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Federal agencies are frustrating congressional cost-cutters by their reluctance to exploit up-to-date software tools and technology that could save millions of tax dollars annually.

A recent report by the General Accounting Office (GAO), the investigative branch of Congress, suggested that many agencies are either unaware of newer, better methods of software development and maintenance or reluctant to adopt them.

Although the problem is not restricted to the government, federal agencies are falling behind private firms in the use of modern software techniques, according to the GAO, which has been concerned by the billions spent annually for government software.

Federal software conversion costs alone are running at more than \$450 million a year, the GAO has found. In an earlier investigation, the agency detailed widespread problems in federal management of software development programs in general [CW, Dec. 3].

Software Tools

In its most recent study, the GAO looked at government use of such software tools as preprocessors, program analyzers, test data generators and on-line programming support programs, as well as various modern software

techniques, including structured programming, top-down program development and concurrent documentation.

"Unless federal automatic data processing management makes more use of such technology, federal computer software will continue to cost millions more than is necessary," the report concluded, noting that government software costs, now estimated at \$6 billion a year, may constitute 90% of all federal DP expenditures by 1985.

Management Control

These figures indicate DP management must take more responsibility for software development, which until recently "was considered an art" and left to the control of DP technicians, the GAO said.

This lack of management control has led to development of software systems that cost too much to operate and maintain, cost overruns and delays in software development projects, redundant software development, excessive conversion costs and delays when hardware is changed, the report noted.

Despite the potential of new software tools and techniques to reverse these trends, "many organizations — federal and private — have not exploited what is available to them," the GAO said.

Progressive Firms

"Private firms which sell software or produce it on contract are the only or-

ganizations which consistently exploit the newer software technology," the report continued.

"Most government and private facilities have made only moderate use of better software tools and techniques."

Through DP site visits, questionnaires, interviews and a search of current literature, the GAO found "most managers and staff members of software producing firms were very interested in modern programming practices and new technology."

Moreover, "certain government units and private firms other than software firms" do use the newer, better software techniques.

But "many such installations have achieved only limited to moderate progress in applying this technology, and some have not used it at all," the GAO continued.

Although many private firms contacted were no more interested in these new techniques than government agencies, the GAO said that, generally, it saw "more interest in, and more organizational efforts devoted to, better use of software techniques at the private sector facilities."

Citing problems government agencies have experienced as a result of mismanaged software development, the report noted that the Social Security Administration made unauthorized payments of approximately \$1 billion between 1974 and 1976 largely because of "incomplete, untested or

erroneous computer programs."

Modern software techniques could reduce the risk to government of similar, expensive snafus and at the same time significantly reduce operating costs, overruns and delays, redundant software projects and conversion costs, according to the GAO.

While the report's conclusions will likely come as no surprise to those in the DP industry who have been advocating top-down development and structured programming for several years, the GAO noted federal agencies do not have the profit motive that spurs adoption of these techniques.

The report recommended the Office of Management and Budget motivate agencies by requiring agency heads to establish software quality-assurance functions and more clearly define management responsibilities for the acquisition, management and use of software tools and techniques.

The GAO also called for a governmentwide software research-and-development effort, backed by regulations mandating agency use of standardized software tools along guidelines to be developed by the National Bureau of Standards.

Quip of the Decade?

COMMERCE, Texas — Speaking at the Computer Users Conference here April 17, J.A. Kjeldsen of Shell Oil Co. called the 1970s the "decade of fiche and chips."

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On-Line Access Boosts Public Opinion Archive

By Ann Dooley
CW Staff

STORRS, Conn. — Boycott the Olympics? A Gallup Poll showed only 39% of the American public favored a boycott. But wait, the year was 1938 and the Olympics were set for Japan, not Moscow. This year 72% of the public believes the Moscow Games should be boycotted.

Opinion polls can vary from one day to the next, let alone over the years, but academics and leaders in marketing, industry and government need to follow the changes. How can they track all the ques-

tions on all the surveys?

Many of them do so by using automated search techniques available at the Roper Center, a general-purpose archive of public opinion data where it is possible to find all you ever wanted to know about opinions on almost anything.

Containing opinion polls from 70 countries — some dating back as far as 1936 — the Roper Center, a nonprofit organization located at the University of Connecticut computer center, can sort through approximately 33,000 questions from 1,500 different surveys to determine past opin-

ions about issues that remain issues today.

Reorganization Process

Until recently, this vast body of knowledge had to be searched manually or by a limited-capacity machine. But three years ago, the center began a reorganization process.

The reorganization included transporting the vast collection of records from Williams College in Williamstown, Mass., to its new repository at the University of Connecticut here. It also involved converting the large amounts of data to the university's sophisticated computer system.

The goal of the reorganization was to make the material more available to more people and to provide updated computer analysis techniques.

In order for research to be most effective, as many polls as possible should be studied to understand changing and frequently ambiguous or opposing views, according to Everett Carl Ladd, professor of political science at the university and director of the reorganization.

Sophisticated computer techniques can provide the sorting capabilities needed, he added.

The new Roper Center grew into a joint project between Yale University, Williams College and the University of Connecticut, with each having access to the center.

Conversion Project

Computer cards, tapes and paper questionnaires were packed and moved to their new home more than one hundred miles away. The entire conversion project is expected to cost nearly \$3.5 million, but the conversion will take place in smaller and less costly stages, according to Ladd.

At its old headquarters, the Roper Center used a "classic antique" RCA 301, which was closed down when the center moved. The machine still worked, but the task grew too big for the equipment, Gary Grandon, assistant director at the center, said.

Now computer time is bought on the University's main computer system — an IBM 370/168 and a 370/158 linked together through an automatic spooling program and running under the IBM VM/CMS operating system.

The move to the new center created more problems than would normally be caused by the distance between the two centers, Grandon said.

Data had previously been collected and stored on punch cards under a column binary, multipunch method, and it was "quite a task" to convert the forms to modern statistical packages, he noted.

Now, each survey is listed in

a library form and has several subject data files which can be converted to statistical information whenever necessary, Grandon said. Duplicate volumes of tape are stored at several off-site locations.

Key Words

When searching for specific survey data, key words are crossed and the system then searches its files to find similar words and surveys.

To find out about television viewing habits, for example, Grandon matched the words "TV" and "viewing habits" and found that in the early 1940s, surveys were asking Americans whether they had ever heard of TV. In the late '40s, the surveys began asking

whether the public had ever seen television.

In the early 1950s, Americans were asked if they owned a TV. By the end of the decade, people were polled to find out how often they watched television.

Eventually, the scope of the file will be enlarged so that the center can perform on-line searches from all surveys, which would encompass more than half a million questions, Grandon noted. But that will still be a while, he added.

And even with sophisticated automated techniques, if a search does not come up with anything, some clients will ask the center to perform a manual search of the entire collection of survey records.

Long to Teach Seminars For DP/MIS Professionals

PONCA CITY, Okla. — Three two-day seminars for DP and management information services (MIS) professionals will be conducted here from the last week of July through the first week of August.

Teaching the seminars will be Dr. Larry Long, assistant professor of industrial engineering at Lehigh University and president of Long and Associates. That company provides consulting and educational services in the area of computer systems and DP/MIS management.

The first seminar, "DP/MIS Documentation and Procedures," was designed for DP personnel who wish to improve or develop a DP/MIS

documentation methodology and standardized DP procedures.

"DP/MIS Management" was designed for DP management personnel who want to create a well-ordered working environment. The third seminar, "How to Prepare and Present an In-house Management Seminar," is for DP managers, training coordinators and other DP professionals.

Each of the seminars costs \$550 and lodging expenses are separate.

More information is available from Long and Associates, Education Division, 820 Tioga Ave., Bethlehem, Pa. 18018.

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Different Values and Expectations 'New-Breed' DPer Seen Impacting Management

By Jeffrey Beeler

CW West Coast Bureau

MINNEAPOLIS — A new breed of computer-room employee is rapidly filling the ranks of the DP work force, and its arrival on the scene will prompt some radical changes in the way DP managers think about and supervise their personnel, a management consultant said here recently.

In its professional values and work

Course Slated On Negotiation

NEW YORK — A five-day course on computer contract negotiation sponsored by the Brandon Consulting Group, Inc. will be held here on June 9-13.

The intensive course is aimed at management and will cover the contracting process, software and service contracts, negotiation and legal issues, general clauses, contract administration and projects management and dispute resolution and enforcement.

The fee for the entire event is \$975, but attendees can select only the days they wish to attend at a pro-rated price scale, a spokesman noted.

A brochure and additional information on the course can be obtained from the registrar, Brandon Consulting Group, 1775 Broadway, New York, N.Y. 10019.

expectations, the new breed differs sharply from every generation of computing professional that has ever preceded it, according to John Byrd, a senior partner in the Louisville, Ky.-based management consulting firm of John T. Byrd & Associates.

New breed members, in general, are better educated than their predecessors. They characteristically subordinate their companies' interests to their own personal welfare. They readily question authority, and they are quick to change jobs if they feel dissatisfied with their current employers.

Managers' Attitudes

Some DP managers, especially seasoned veterans, might find the latest crop of young employees and their ideas bewildering, disturbing and difficult to accept. But like it or not, the new breed of computing room worker is here to stay, Byrd said during the 10th annual conference of the NCR Corp. User Group Federation.

The shifts now taking place in the DP labor force's attitudes, Byrd said, mirror on a small scale the changing work values of the U.S. population in general. Thus, DP managers who dislike the attitudes of their new breed employees can do little if anything to change them.

To cope with the new generation of professionals now entering the computing field in growing numbers, DP managers will have to change them-

selves instead. In other words, they will have to adjust their thinking patterns, management roles and leadership styles to suit the changing needs of the people working under them, Byrd said.

DP managers who refuse to adapt to the changing face of the computing field's work force will have a hard time winning their employees' trust and support and will have to face a high turnover rate at a time when skilled staffers are already in critically short supply.

New Demands

Speaking on the subject of "Managing the New Breed," Byrd described the latest generation of computing professionals as a young, relatively inexperienced group of workers who challenge the autocratic management styles that have historically dominated U.S. business.

Members of the new breed, he said, demand to exercise more freedom and responsibility on the job than did the generation of workers who preceded them. They dislike work environments where their activities are tightly supervised every minute of the day and where everything they do is dictated to them by management.

They also expect open lines of communication with upper management, improved access to corporate information and an opportunity to exercise an increased voice in formulating company policy, Byrd said. Members of the new breed want a chance to participate in company decision making, and they look askance at organizations in which the power to set corporate policy is concentrated in the hands of a few top executives.

Among their other distinguishing traits, members of the new breed demand jobs they consider meaningful and professionally challenging.

To manage the new breed effectively

and cope with the problems it poses, DP managers have to increase their flexibility without abdicating any of their power, Byrd said. They have to realize the new breed's work attitudes are merely the product of a changing social climate — a reflection of a different outlook on life — and not an expression of disrespect or hostility.

Success in managing the new breed also depends on management's ability to listen to and understand its younger employees' points of view.

DP managers should avoid feeling threatened by the new breed's different work values or misinterpreting its questioning attitudes as personal attacks, Byrd said.

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DPers' Work Needs Assessed

By Marguerite Zientara
CW Staff

NEW YORK — In presenting his ideas on how best to motivate people in an automated environment, Eric M. Stout, management analyst for the Department of Agriculture, drew on the work of six well-known psychologists and sociologists.

Speaking at the recent National Micrographics Association's 29th conference, Stout first described psychologist Abraham Maslow's "hierarchy of needs," emphasizing that people are individuals "with complex, interrelated needs that change with time and in different situations."

While some jobs manage to satisfy most needs, Stout said, "some [other] jobs satisfy the biological and security needs fairly well, but are lousy for the social, ego and growth needs, not to mention the aesthetic and intellectual needs."

However, he noted, when jobs are designed to satisfy most of these needs, "people are more productive, especially in the long run."

Beyond Basics

According to sociologist Frederick Herzberg, "dissatisfiers" like company policy, supervision, relationships, working conditions, pay, personal life, status and security are "enough to keep people coming to work."

"It is the 'satisfiers' like achievement, recognition, the work itself, responsibility, advancement and growth that really 'motivate' people to be more productive," Stout said.

Another relevant approach that was mentioned was that of Psychologist David McClelland, who has theorized that people have differing needs for achievement, affiliation and power, which can be powerful motivators.

Although such needs develop naturally "from life-long experiences," they can also be cultivated on the job "with the proper job design, management style and communications," Stout said.

Styles of Motivation

As for how management should attempt to motivate workers, Stout cited several theories of management style, including Rensis Likert's "Four Systems of Management."

Likert's four systems include the Exploitative-Authoritative, Benevolent-Authoritative, Consultative Participative Group methods.

"Although most organizations and managers are System 1 or 2, with a 'Do-what-I-tell-you' approach," Stout said, "Likert found people are more motivated and productive when treated with System 3 or 4 styles of management."

Under System 3 or 4, employees help to set their own goals, are involved in decisions that affect them, are treated with respect and are supported and guided to do better, rather than criticized.

In addition, such employees have positive, open communications with management, have a lot of responsibility and independence, have a spirit of teamwork and cooperation and use self-control more than "boss-control."

Stout also presented David McGregor's idea that "Theory X" (negative) and "Theory Y" (positive) bosses can actually create either negative or positive attitudes in their workers through their own attitudes.

"Researchers have found, in general, that a Theory Y organization is more productive, although the benefits may take a long time to show up."

A Theory Y manager assumes, for example, that people enjoy work, seek responsi-

BAI Begins Study Of U.S. Programs Of EFT Payments

PARK RIDGE, ILL. — A major study of the U.S. Treasury Department's direct deposit and electronic funds transfer (EFT) program for recurring payments — such as Social Security payments — is currently being launched by the Bank Administration Institute (BAI).

"Costs and Benefits of Participation in the U.S. Treasury's Direct Deposit Program," will be conducted through the summer, and findings will be released in September, a BAI spokesman said.

Study results are expected to quantify the cost and benefits of the program to participating institutions, specify alternative cost accounting methods, show cost comparisons of alternative processing forms and identify the differences between direct deposit and non-direct deposit account balances, he continued.

Some Variables

Variables will include geographic location, types of financial institutions and the number and characteristics of direct deposit transactions.

The research was developed by the BAI and will be funded by the Institute, the U.S. Treasury, the U.S. League of Savings Associations and the National Association of Mutual Savings Banks. The study contract has been awarded to Peat, Marwick, Mitchell & Co. and Electronic Banking, Inc.

Further information is available from David Van L. Taylor, BAI, 303 S. Northwest Highway, Park Ridge, Ill., 60068.

bility and work for self-fulfillment, "not just for money," Stout said.

Theory Y managers also treat mistakes as learning experiences, give out fair rewards and punishments, behave logically and consistently and listen to employees.

The culmination of these styles of management lies in the theory expounded by Chris Argyris, who has written on "congruence" as the "secret ingredient" of productivity. Congruence means that people "plug in" to an organi-

zation instead of just "plugging along," Stout said.

"People have a wide range of needs, goals and interests. When they come into a job, the trick is to harness their energy and turn it into productivity."

"If people take on the goals of the organization as their own goals, they are more 'congruent,'" he explained. To achieve congruence managers must design jobs and provide conditions that allow people to satisfy their needs as described by the psychologists cited.

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Technology Just One Aspect Productivity Boost Seen Tied to Human Factors

By Marguerite Zientara
CW Staff

NEW YORK — In attempting to boost lagging U.S. productivity, managers should concentrate not only on computer and other technology, but also on the human factors involved in automation.

Technology, in fact, makes up the smallest percentage of a preferred "multidimensional" approach to improved productivity, which also includes "people factors" and management factors, according to Eric M. Stout, management analyst for the Department of Agriculture.

Speaking at the 29th annual National Micrographics Association Conference here recently, Stout described the effects of office automation "on the human situation."

Changing Social Groups

First, Stout noted, office automation causes the work group to change. "When we bring in a micrographics, word processing (WP) or DP system, people are often regrouped to efficiently use the



CW Photo by M. Zientara
Eric M. Stout

equipment.

"After a while, people will settle down and get back in the groove," he said, "but what is the net effect on productivity of changing the makeup of the work group?"

Automation also causes social relationships to change, cutting down person-to-person contacts and increasing person-to-machine contacts.

"People need the proper kind and amount of human interaction to be revitalized and to maintain their interest

and job motivation," he added. "Let's keep an eye on productivity and human satisfaction when we design automated systems."

A third result of office automation is that duties, skills and job potential change — sometimes for the better, but often for the worse. "People can learn new skills and move into new careers, or they can be shuffled into specialized, dead-end jobs.

"An imaginative manager will recognize that dead-end job design leads to dead-end production and will [instead] design interesting, flexible jobs that allow growth for workers," Stout recommended.

Responsibility and Motivation

Furthermore, automation brings changes in one's responsibility. "At the helm of a micrographics system, word processor or a terminal, people can take on more responsibility for handling the organization's information resources," he said.

While this sense of new responsibility can give people a new motivation for their jobs, in some cases credit is given to the machine alone for achievement.

"Robbing people of their sense of responsibility and importance can make them feel they are just an extension of the machine. Instead, management should continue to recognize the accomplishments of those who operate the machines," Stout commented.

In addition, automation can give people more independence because they work

alone with their machines. "But automation takes away their independence in another way — they do their work only in the way the machine is designed to accept it.

"So it is really the machines — because of their inflexibility and special needs — that are controlling people in the long run," he added.

Altered Working Conditions

Finally, centralization of micrographics, WP or DP functions can change the work environment.

Noise, space, privacy, aesthetics, mobility and stimulation can each work for or against productivity "depending on how a manager handles them," Stout said.

All these factors combine to change a person's self-image, status and motivation. "If we pay attention to all the ramifications of the human-machine interface — and how our office automation systems affect people — we can increase productivity as well as improve human satisfaction," he maintained.

ACM Monthly Adds Section On 'Computer Practices'

NEW YORK — The Association for Computing Machinery (ACM) has announced that *Communications of the ACM*, its monthly membership publication, will feature a new section, "Computing Practices," beginning with its May issue.

The section is part of an effort by ACM to publish more material of direct and immediate interest to computing practitioners, according to *Communications* Editor Dr. Robert L. Ashenbush.

"Papers contributed to 'Computing Practices' will be accepted on the basis of applicability to a general computing audience and reviewed for definitiveness, interest and importance to the practice of computing," Ashenbush said.

Scope of Articles

The scope of "Computing Practices" articles will include the design and construction of applications systems; discussion of computer systems, tools and techniques as they relate application systems to the large computing environment; and methodologies for the management of the DP function.

The initial section will include articles by Robert L. Glass on real-time software debugging and testing and Joshua Turner on the structure of modular programs. Both authors make specific

recommendations in their articles, according to an ACM spokesman.

Those interested in contributing papers should send them to John Seaman, Computing Practices Editor, the Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036.

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Software House Has Plans for Nine-Digit Zip

By Jay Woodruff

CW Staff

ADDISON, Ill. — National mailers will face big challenges as they attempt to implement and maintain the U.S. Postal Service's (USPS) nine-digit Zip Code next February.

That is the opinion of James E. Pehta, vice-president of research and development here at the List Processing Co., which develops software for mailers.

A major challenge will be to determine how to integrate the

2.25 billion bytes of data that are expected to make up the USPS' Zip Code data base into a national mailer's own data base. "A mailer will have to decide whether it has the in-house talent to develop techniques to use the Postal Service data base or whether it will have to contract to a software service to have it done," Pehta said.

The USPS data base, which is now being assembled in Memphis, Tenn., will be available next February on

magnetic tape to large users and on microfiche to smaller users. It is expected to contain about 19.8 million data items of 110 characters to 130 characters each.

Each item gives four add-on Zip Code digits for an area as large as a street block or as small as any business that receives at least 10 pieces of mail daily. Between 17 and 20 reels of 6,250 bit/in. magnetic tape will be required to hold the raw Postal Service data, Pehta predicted, while users of 1,600 bit/in. tape will need between 80 and 100 reels to match the nine-digit codes with the addresses in their present address data bases.

In order to make the data more manageable, the List Processing Co. is going to apply "specialized compression techniques to remove extraneous data and use accessing techniques to get at the codes efficiently."

Large mailers will have to use similar techniques in order to put the data base in a usable form, Pehta indicated. Regional mailers, however, contending with only part of the huge data base, will have fewer addresses to match and therefore will not have to worry as much about compression.

Two Disk Packs Needed

List Processing plans to put conversion software and the compressed and consolidated Zip Code data base on disk for its customers. While he cannot be certain how much space the data base will take up until the firm gets the USPS tapes in February, Pehta figures the software and the Zip Code files will fit on one or two IBM 3350 disk packs.

All large mailers, regional or national, will have to ensure that the Zip Codes now in their data bases are correct in order to match an address and its current code to the same address with the new nine-digit code, Pehta said. Users will also have to message, edit and "clean up" their files to ensure that addresses under the present codes can be matched to the expanded codes.

Some of that clean-up effort will have to focus on the many ways an address can be written, Pehta noted. This will be the user's problem because the post office's Zip Code files will list those addresses only one way.

For example, a person may give his address as Apartment 20, Apt. 20 or #20. User software must be able to recognize it in whatever way it is written so it can be matched with the USPS version of that address.

Errors in the user data base on the order of 1% or 2% could adversely affect a mailer with multimillion-piece mailings,

Pehta warned, suggesting that file updates and revisions will be easier to make on a "clean" data base. In List Processing's view, an accurate data base "gives us a leg up on someone who is trying to use the raw files without any editing."

"In round numbers, 30% of household addresses are at apartments, condominiums or cooperatives," he said. List Processing is developing software that can recognize an apartment number in any known form, isolate it or identify it and include it within matching logic to properly relate it to the nine-digit Zip Code data base.

The software firm plans a

similar approach to match businesses with more than 10 pieces of incoming mail daily to their correct Zip Codes. However, there will be a "degree of difficulty" in matching businesses in a single building to their correct Zip Code if their present addresses do not identify exactly where they are located in the building. "We haven't solved that problem yet," Pehta admitted.

Improper spellings or abbreviations that deviate from those in the USPS data base are sure to cause problems, too, he said. List Processing will include software in its conversion packages that runs through a variety of spellings.

ACM Seeking Nominations For Grace Hopper Award

NEW YORK — The Association for Computing Machinery (ACM) is seeking nominations for its Grace Murray Hopper Award, given annually to an outstanding young computer professional.

The recipient, to be selected on the basis of a single recent major technical or service contribution to the computer industry, must have been 30 years old or less at the time the qualifying contribution was made.

Emphasis this year will be placed on outstanding contributions in the fields of DP and/or personal computing because the Award Committee feels these areas have not been adequately rewarded for contributions in the past.

The award — to be presented Oct. 27 at ACM's annual conference in Nashville, Tenn. —

is in the amount of \$1,000, donated by Univac, and includes a certificate.

Nominations, which may be made by the nominees themselves, should include:

- Name, address and phone number of the person making the nomination.
- Name, address and phone number of the nominee.
- A statement of 200 to 500 words on why the candidate deserves the award and describing the contribution.
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Policymakers Ignore DP as Economy Aid: Davis

By Phil Hirsch

CW Washington Bureau
WASHINGTON, D.C. — Although greater computerization could make the U.S. economy more productive, few government policymakers have the expertise or the desire to exploit this opportunity, Dr. Ruth Davis said here recently in an address to the Federal DP Expo conference.

Davis, who has held several computer-related positions in the federal government — notably, the directorship of the Institute for Computer Sciences and Technology at the National Bureau of Standards — is now assistant secretary for resource applications at the Department of Energy.

One piece of evidence that government policymakers lack what it takes to fully utilize computer capabilities is that most related legislation and regulation enacted in the past decade "has been essentially negative," she contended.

Instead of encouraging the integration of computers and communications, for example, federal policy has discouraged it, according to Davis. She also argued that government export control policy has made it difficult to exploit our leadership in what she called "electronic logic" to improve the U.S. balance of payments.

National Productivity

Another area where federal policy has failed to make full use of computer technology involves national productivity.

Computers, Davis pointed out, are the best means of doing jobs that are "too dangerous, too fast, too complex or

too boring" for humans. As such, computers could help significantly to reverse the decline in productivity that has occurred during the past several years in this country.

This reversal has not happened because the government has failed to encourage greater investment in computers by the private sector.

There has been much discussion of a "national information policy," Davis added, but

it has been concerned far too much with definition of terms and not nearly enough with more substantive issues.

Moreover, the basic thrust of that discussion has been wrong. Instead of a single national information policy, she said, what is needed is a "mosaic of policies," each addressing "micro areas and issues" and collectively creating a "national feeling that computers are a tool for enhancing

national well-being."

Underlying all these problems is the reluctance of senior policymakers to really understand the capabilities of computers and how to use them in their own jobs.

Many of these officials will not install terminals in their offices because they "don't know what buttons to push without studying the instruction manual," and they are afraid to display their ignorance, according to Davis.

"Until we can change that

negativism, we have a serious problem," she said.

Davis stressed the point that computer professionals have a major responsibility for bringing about change. They must get more of their own kind into positions where they can influence government policy.

However, Davis neglected to explain how this could be done.

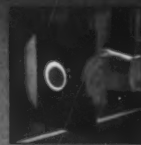
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June ESD Session To Discuss Use Of Small Systems

DETROIT — A one-day seminar aimed at those users considering a purchase or expansion of a small business computer system will be presented here June 4, sponsored by the Computers and Communications Committee of the Engineering Society of Detroit (ESD).

"Small Computers and the Professional" will include sessions on computer hardware and software, industry trends and personnel training procedures. A variety of DP case histories will also be presented throughout the full-day affair.

The seminar will feature 12 speakers and about 20 exhibitors.

The registration fee for the event is \$75, which covers all activities including lunch. Additional information is available from Carol Lynn, ESD, 100 Farnsworth, Detroit, Mich. 48202.

Training Delays Plague Conversion

By Connie Winkler
CW Staff

CHICAGO — The best-laid plans can and do go astray, as when the Navy Federal Credit Union recently began training 41 DPers for an upgrade from DOS/V5 to MVS/JES3.

The training began in early 1979 and is still in progress because of a delay in the CPU delivery, according to Lyn Nichols, who is in charge of DP training for the world's largest credit union.

Nichols listed other problems hurting the training at a session on "Planning a Conver-

sion" at the recent Deltak, Inc. 1980 DP training conference here:

- Other major DP projects were falling behind so some employees were pulled from training classes.
- There was heavy personnel turnover in the six training groups so there had to be catch-up tutoring and makeup classes.

- Because of the CPU delay, the training proved untimely.

To prevent these delays, Nichols recommended securing commitment of top management to the training so that employees will not be pulled from the courses.

DP-Based Eye Diagnosis Detects, Analyzes Tumors Without Surgical Removal

By Bruce Hoard

CW Staff

NEW YORK — Researchers at the New York Hospital-Cornell Medical Center here have developed a computer-based eye diagnosis technique that can assess the nature of tumors without removing the eye.

The breakthrough was an-

nounced by Dr. D. Jackson Coleman, chief ophthalmologist at the hospital and a moving force behind the technique. Working with Coleman on the project is Dr. Frederick Lizzi of the Riverside Research Institute.

The technique uses ultrasonic waves that are beamed into the eye at high frequency and returned as echoes. The returning echoes are read by a Digital Equipment Corp. PDP-11/60 and reproduced graphically in hard or soft copy with the aid of a Genisco Computers, Inc., 3060 graphics display system.

Computer Analysis

Although ultrasound has been used before in discovering tumors in other parts of the body, the computer analysis provided by Coleman's system was lacking, Mary Smith, senior research associate with Coleman, said.

The new technique has enhanced a standardized procedure known as an ophthalmoscan, which was previously hindered by its inability to see through impediments in the eye, such as blood.

"The blood presents no problem to us in terms of visualization now because it just appears as a different density on our screen," she noted. "The computer analysis can tell where the blood is and in some cases where it came from."

More importantly, the analysis can reveal dangerous irregularities such as a detached retina or tumor that may be lurking behind the blood, she said.

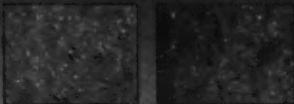
Just as the amount and source of blood can be determined, so can the location, size and general appearance of tumors, she explained. By studying specific tumor tissue properties like contour and configuration, Coleman hopes he will be able to determine from printouts whether tumors are benign or malignant.

As a step in that direction, the researchers have been comparing their graphics information with actual tumor tissue, and Smith said they are beginning to understand that relationship better.

However, she warned, there is still no way of determining, from computer printouts, whether a tumor is benign or malignant.

Up to 1,000 eyes are surgically removed each year as a precaution against intraocular melanoma, the most common form of eye cancer. Coleman's technique, when perfected could save those eyes, Smith said.

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3M

How to Improve User Interaction?

Q Recently I was placed in charge of developing a program to improve user interaction within our corporation. I'm the assistant director of what most people would consider a large information services department. During a weekly staff meeting, our systems manager suggested that I write and see what you have to say.

Here's our situation. We have the usual problems in determining what the user wants during the design phase and, consequently, our users are less than satisfied with the end products. What little feedback we get about the services we provide is routed through a vice-president who is in charge of the Information Systems Department as

well as several other corporate services. Ultimately this feedback comes to us in the form of reprimands.

In recent years we have worked very hard to develop what we consider excellent standards and procedures within the Information Systems Department. Unfortunately, the lack of interaction with functional area personnel precludes us from achieving the level of quality and service we would like.

I would appreciate any ideas you might have that would help us improve our user relations and interaction.

A First of all, the formal line of communication (user-DP) should not be through the vice-

president. Designate one person, or more if necessary, to serve as a user liaison. This person should be charged with the responsibility of rendering some level of satisfaction to the user.

I'm sorry to say that the user usually gets the runaround unless there is a formal communication link. A phone number and perhaps a sympathetic ear will do wonders for user relations.

Obviously a user liaison can't solve all problems on the spot. When a compromise is the only solution, the user liaison can assist in arbitrating the differences. When no compromise is necessary, the liaison may work with the user to prepare a working plan.

Your confidence in your internal procedures indicates you probably have a methodology for systems development

Turnaround Time By Larry E. Long



and, perhaps, for such other DP functions as long-range planning. Is the user incorporated in your methodologies? For example, does the project team have at least one user representative?

Whether it be systems development of long-range planning for information services, the user has the right to be consulted at strategic milestones throughout the process. The user also has the obligation to provide feedback and ultimately an affirmative commitment at each of these milestones.

Several large corporations have provided slots within the organizational structure of the data center for user personnel from the various functional areas. These users return to their functional areas after one and a half to three years.

This structure has several positive features. The user brings with him knowledge of the functional area and returns with a substantial knowledge of and sympathy for DP operations. A permanent informal communication link is established.

I personally feel this is a good approach. However, in order to be successful, the user must voluntarily seek this assignment; therefore, the company should not only make this position attractive, but provide a mechanism for mainstreaming these users back into their functional areas with out impeding their careers.

There are several ways to make significant improvements in user interaction that require a minimum of effort. For example, DP professionals should make a concerted effort not to talk in computerese. Computerese may be a time saver among DP professionals but it is not necessary to communicate with users.

In addition, DP managers often commit themselves to an unrealistic completion date in order to temporarily relieve tension. In the long run this does more to impede user interaction than being "up front" and telling the user the bad news.

Although the implementation of these approaches will improve user interaction, in the final analysis the key to successful user interaction is user management and analyst education. Set up an ongoing program of in-house seminars devoted to increasing awareness and knowledge in the areas of information systems, department policy and procedures, and the relationships between the various functional areas.

These seminars should be presented at all levels — operational through strategic. User education has evolved to be the responsibility of the DP department.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701. Long is a professor at Lehigh University, a DP consultant and author.

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THE EFT ACT IS LAW

By Pender McGarter

*Effective May 10, Regulation E is
"a watershed . . . in electronic banking."*

After two years of work, the final, amended version of Regulation E implementing the Electronic Fund Transfer (EFT) Act of 1978 became effective on May 10 — just two days ago.

The Federal Reserve Board in those two years exercised considerable latitude in interpreting the will of Congress to "demonstrate that the consumer protections of the proposed regulations outweigh the compliance costs imposed upon consumers and financial institutions."

"We spent more time on . . . implementing the EFT Act of 1978 than we did on deliberating the monetary policy of the United States," a bemused member of the Federal Reserve Board said recently.

EFT Background

In the early 1970s, the "checkless/-cashless" society was thought to be imminent. One publisher promoted his EFT newsletter, asserting, "Electronic funds transfer is the system of the future. It is the catalyst of the checkless/-cashless society. Is your firm ready to enter the Society of the Future?"

Yet EFT development has been gradual and evolutionary:

- **Technological Developments.** The U.S. followed Western Europe's lead in developing ATMs. In 1974, the First Federal Savings & Loan Association of Lincoln, Neb., installed machines in a food chain to facilitate deposits and withdrawals.

About the same time, point-of-sale (POS) terminals were used in Washington State retail establishments for debiting the sale of merchandise to a customer's savings and loan account. The POS terminals have been more commonly used for check and credit card authorizations.

During the early '70s, Burroughs Corp. and IBM introduced new ATMs and POS terminals, and AT&T announced its Transaction Telephone for card authorizations.

In 1972, a Seattle bank offered a computerized telephone bill-paying service. The bank later sold its ownership in the service because of a lack of Touch-Tone customers who could gain access to the computer. (The state-of-the-art may eventually allow individuals with rotary dial phones to interact.)

In 1975, the federal government initiated its Social Security direct deposit program. Payment information is now transmitted to participating financial institutions on computer tape.

- **Regulatory Policy.** In 1974, Congress passed a law creating the National Commission on Electronic Fund Transfers (NCEFT). The NCEFT was directed to recommend legislation providing for the development of public and private EFT systems. One year later, President Gerald Ford appointed a commission chairman and 13 commission members, including representatives of the financial, public, retail and government sectors.

From the beginning, the NCEFT was criticized for its political leanings. The chairman was the former ranking Republican of the House Banking Committee, credited with quashing an early investigation of the Watergate burglary. The executive director sought and obtained his position through the

ranking Republican of the Senate Banking Committee.

In addition, industry and professional associations such as the Association of Data Processing Service Organizations and the American Federation of Information Processing Societies, Inc. cited a lack of data processing expertise. Similarly, consumer groups were critical of the commercial orientation of the NCEFT.

Nevertheless, the commission held numerous public hearings during its two-year life — providing a forum for industry, professional and consumer groups alike. Compared with other national study commissions, it appears the NCEFT Final Report will truly be influential "for many years to come," as the commission's vice-chairman predicted in 1977.

It is known, for example, that the Federal Reserve Board closely studied the NCEFT report in promulgating Regulation E.

Regulation E in a Nutshell

In brief, Regulation E affects the issuance of "access devices" (debit cards), initial disclosure of terms and conditions for EFT accounts, liability of consumers for unauthorized transfers, documentation of transfers, preauthorized debit and credits and procedures for "error resolution."

According to the regulation, unsolicited debit cards must be validated before they can be used for effecting transfers. The financial institution is required to provide initial disclosure of the terms and conditions of an EFT account, including information about consumer liability and error resolution. Consumers are liable for unauthorized elec-

tronic fund transfers up to the total amount lost, depending on when they notify financial institutions of errors on their statements.

In cases of alleged discrepancies, the institution is required to conduct an immediate investigation or recredit the consumer's account with the disputed amount on a provisional basis. In addition, it must provide a printed receipt with an automated teller machine (ATM) transaction and at least a quarterly statement on any EFT account, even if no transfer occurred. With respect to preauthorized debits and credits, the consumer has the option to telephone an institution verifying his debits or credits.

In general, the NCEFT favored unfettered development of EFT with minimum government intervention and maximum private-sector involvement. The commission suggested that EFT services be provided by regulated carriers through separate subsidiaries.

Current telecommunications legislation in the House of Representatives would implement this NCEFT recommendation. The House bill, as well as two comparable Senate measures, would also exempt EFT and other electronic message systems from regulation by the Federal Communications Commission.

The NCEFT argued that the Federal Reserve should continue to provide automated (check) clearinghouse (ACH)-like services. The panel had retreated from an earlier, interim recommendation in which it suggested a federal role in POS switching involving the government in consumer-initiated EFT.

A White House Task Force is currently investigating the advisability of a federal role in providing and regulating EFT services.

In 1976, the "Fed" consolidated the regional ACHs in a single, nationwide network. At the time, a member of the Ford Administration criticized the Fed's pilot program as a "surreptitious development of an on-line capability."

The NCEFT recommended that EFT terminals with debit services be deployed nationwide. Retailers have been reluctant to install terminals in their establishments as long as more than one access device can be used with proprietary cards.

The commission felt that deposit-taking through terminals should be gradually expanded. It suggested that initial steps be taken in contiguous metropolitan areas such as Washington, D.C., Maryland and Virginia. Deposit-taking terminals are generally forbidden by the McFadden Act, passed by Congress more than 50 years ago to protect the dual banking system.

Under the McFadden Act, federal banks are unable to expand their services in jurisdictions where state banks are restricted. A national bank is, therefore, forbidden from establishing a branch (which the federal courts have ruled includes an ATM accepting deposits) in states which disallow branching.

It is not clear whether federal banks would be permitted to cross state lines in jurisdictions where states are also

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IN DEPTH

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permitted to do so.

Another White House Task Force is expected to issue its recommendations on the McFadden Act. Congress awaits this report prior to resuming its own hearings on branching, hearings that began more than two years ago.

The NCEFT, following legal objections from the Justice Department, opposed mandatory sharing of ATMs. "Limited sharing" of ATMs by smaller institutions which cannot otherwise afford terminals might still conform to antitrust laws.

Because of a concern of smaller banks that larger institutions could dominate EFT with huge capital investments, almost half of the states now require some kind of EFT sharing.

The commission recommended that government be granted access to EFT financial information. The EFT Privacy Act, now in the Senate, contains a similar provision. If passed, this bill would nevertheless require a court order to obtain EFT data for legitimate law enforcement purposes.

The Right to Financial Privacy Act (RFPFA), enacted in 1978, gives individuals the option to review personal financial data as well as correct inaccuracies. Prior to the RFPFA, the Su-

preme Court held that such data was the property of the institution.

In addition, Regulation E requires financial institutions to notify consumers of cases where they might release customer information to third parties.

The NCEFT favored a monthly, written statement for the consumer whenever an EFT transaction occurred. Regulation E requires a quarterly statement regardless of whether a transaction took place, an interpretation unpopular with many bankers who wish to eliminate as much paperwork as possible with electronic funds transfer.

The commission recommended that the consumer assume the burden of proof for reporting unauthorized transfers. Regulation E requires the customer to scrutinize his periodic statement for possible errors. Otherwise, the individual is subject to unlimited liability for unauthorized transactions after 60 days.

The Federal Reserve Board is urging Congress to impose a \$50 limit on all consumer EFT liability, such as exists now with credit cards.

The NCEFT opposed the equivalent of a paper-based stop order for electronic banking. Members argued that

this would be inconsistent with the aim of EFT to provide immediate payment. However, as previously noted, Regulation E allows provisional credit on disputed billings.

EFT Today

Regulation E might be viewed as a watershed in the development of electronic banking. As this first EFT regulation becomes effective, electronic banking (if not the harbinger of the checkless/cashless society) is burgeoning.

The installation of ATMs has followed early, optimistic projections. Some 9,750 terminals were estimated at the end of 1978. Despite heavy demand, this figure represents a drop over 1977 because of a lack of supply. At the beginning of last year, some 4,000 back orders were pending.

Bankers stress that customers appreciate the convenience of ATMs. They note that lines forming in front of the machines adjoining a bank often surpass the lines inside. Bankers add that ATMs assist them in overcoming their reputation for "stuffy" bankers' hours.

One study has shown that minority groups prefer the terminals because, in their view, machines (unlike people)

cannot discriminate. Another has shown that all socioeconomic groups patronize ATMs, not just the more affluent and educated, as originally thought.

Perhaps understandably, terminal use flourishes in "redlight districts," where cash is a high priority.

Aside from their value in attracting new customers, ATMs are a potential source of new revenue for bankers who may ultimately charge for access. Already, some bank card issuers impose service and finance charges for terminal cash advances not drawn on customers' own funds. Interest is charged from the time of the loan to the time of repayment.

POS Systems

Because of the high cost of data links which (at least for the present) makes direct debiting of customer accounts prohibitive, POS systems are now being installed primarily for check and credit card authorizations. But major retailers such as J.C. Penney Co., Inc. and Sears Roebuck & Co. are expected to be prepared when direct debiting is implemented on a large scale. In addition to immediate technological constraints, direct debiting will be impractical until U.S. regulatory policy on in-

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IN DEPTH

terstate branching is revised.

Currently, J.C. Penney obtains access to Visa's Base I and Base II credit authorization systems. The giant retailer is also considering the use of a wand scanner to read bank cards.

Sears provides authorization services with POS terminals in 11 Milwaukee stores, as does Chase Manhattan Bank with 13 different retailers — including Gimbels in New York and Philadelphia. In 1980, Chase plans to extend its service to additional outlets on the West Coast.

Authorization mechanisms have been unprofitable for banks and other organizations, although they have reduced the cost of doing business. For example, the Banc One service was discontinued in Ohio last year. This year in Los Angeles, Security Pacific National Bank terminated credit authorization.

Telephone bill paying is, at present, being offered by approximately 250 financial institutions. It is estimated that 40% of the savings and loans, 34% of the banks, 21% of the savings banks and 5% of the credit unions provide this service.

Customers can now pay J.C. Penney and Equitable Life Assurance Society through their accounts in the Greater New York Savings Bank. On the same day a customer's account is debited, he receives credit at J.C. Penney or Equitable, not always the case with the early, less sophisticated systems.

Until recent legislation passed in March, telephone bill paying and other automatic transfer services (including moving funds from savings to checking within one institution) have been in jeopardy. Federal courts had ruled that such services needed to be authorized by Congress.

Telephone bill paying, like other forms of EFT, has been more commonly used by banks and their corporate clients. Chase, for example, transfers between \$5 billion and \$7 billion a day at the request of corporate customers. Some of these same clients employ terminals to verify their balances on-line.

Preauthorized Transfers

Direct deposit of government checks, a form of preauthorized credit, has been less successful than its originators expected. Only 24% of those currently eligible participate in the Social Security direct deposit program. However, it is projected that this figure will rise to 55% in 1985 and 80% in 1990.

This year, the Treasury Department estimates the U.S. will save \$32 million from the direct deposit of 144 million recurring payments. It is difficult to ascertain what amounts the system saves in lost or stolen checks.

The federal government also manages its own internal, preauthorized transfers program. In 1979, Treasury's Financial Communications System dispensed \$43.8 billion in funds for government employees' life insurance programs, among others.

In the private sector, corporations are also using direct deposit. For example, 95% of Xerox Corp.'s 40,000 employ-

ees are paid through their banks. Denny's, a nationwide chain of some 700 restaurants, is considering direct deposit to provide weekly paychecks and handle recurring payments. This procedure will facilitate the chain's daily accounting of receipts and expenditures from California to Florida.

Direct deposit suggests another form of EFT, preauthorized debits, involving varying amounts of money. Through the Giro system, Europeans preauthorized utilities payments to

public telephone and telegraph organizations. In the U.S. this year, the National Automated Clearing-House Association is experimenting with a similar plan.

However, Americans will at least be initially skeptical of any system which debits their accounts before they can review their bills.

EFT Projections

It is apparent that the impetus for EFT lies outside the consumer sector

with the banks. Electronic banking is primarily in the interest of financial institutions, perhaps the key to their economic survival.

It is estimated that 35 billion checks are drawn annually on 100 million checking accounts in 14,000 banks. With automation, the Treasury Department projects a 50% savings; the American Bankers Association, five cents per check.

IBM notes that telephone bill paying

(Continued on Page 26)

Announcing an Intel Seminar on Microcomputer Solutions for the '80s.

The 1980s will require total microcomputer system solutions to enable you — the system designer — to keep pace with ever increasing application complexities. To help you plan for the '80s, Intel is sponsoring a series of one-day seminars discussing the directions for future VLSI computer solutions.

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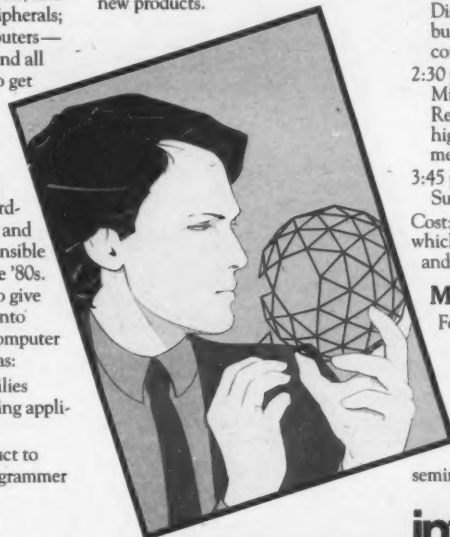
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- Tools to speed your product to market by increasing programmer productivity.

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- Integration of system programming and software functions into silicon.
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Agenda

- 8:00 a.m. Registration
 - 8:30 a.m. Introduction of Intel's total solution approach
 - 10:30 a.m. New Microprocessor Products Preview of three microprocessors covering 16-bit, 16/32-bit, to 32-bit complexity
 - 12:00 Noon — Lunch
 - 1:00 p.m. Microsystem architecture Discussion of new peripheral building blocks and system interconnects
 - 2:30 p.m. Microsystem software Review of new operating systems, high level languages and development tools
 - 3:45 p.m. Summary and questions/answers
- Cost: There is a \$15.00 registration fee which will cover seminar material and lunch.

More information.

For registration information and to guarantee reserved space at the seminar, please contact your local Intel sales office a minimum of one week prior to the seminar in your area. The person to contact for your seminar is listed below, so call today.

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May 16	Seattle, Wa.	Steve Prue	(206) 453-8086	June 19	Philadelphia, Pa.	Gene Murphy	(215) 542-9444
May 20	Baltimore, Md.	Steve Kay	(301) 798-7500	June 20	Dallas, Tx.	Dave Takacs	(214) 241-9521
May 21	Cincinnati, Oh.	Dave O'Hanian	(513) 890-5350	June 24	Toronto, Canada	Franca Martinek	(416) 675-2105
May 22	Detroit, Mi.	Stan Korus	(313) 353-0920	June 25	Montreal, Canada	John Freeman	(613) 829-9714
May 28	Minneapolis, Mn.	Blain Erskine	(612) 835-6722	June 27	Long Island, N.Y.	Don Buchhout	(516) 231-3300
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June 17	Denver, Colo.	Pat Maley	(303) 321-8086	August 5	Melbourne, Fla.	Don Dabney	(305) 628-2293
June 18	North New Jersey, N.J.	Tom Trainor	(201) 225-3000	August 6	New Haven, Conn.	Bill D'Eramo	(203) 792-8396
				August 7	Rochester, N.Y.	Bill D'Eramo	(716) 254-6120

IN DEPTH

(Continued from Page 25)

costs approximately 28 cents per transaction compared with 86 cents per check. Obviously, billions of dollars could be saved each year from check truncation alone.

Bankers are also contrasting such figures as \$300,000 per brick-and-mortar branch vs. \$40,000 per ATM and 72 cents per in-house transaction vs. 27 cents per terminal transaction. They stress that the cost of maintaining paper-based systems is continuing to rise

along with the cost of mail service.

Bankers add that once the Federal Reserve Board begins full-cost pricing for check clearing (previously subsidized by member banks), the financial burden of paper-based systems will be even greater. Finally, they contrast these developments with the dramatic drop in data processing costs.

No doubt financial institutions will continue to press for EFT. And there will be increasingly intense competition among banks to provide these ser-

vices.

Besides bank interests, recent credit controls may also encourage the development of EFT. Already, J.C. Penney and Sears have raised the minimum payments on monthly charge account balances.

Visa card issuers and others are considering annual card fees. Banks which have offered a choice of credit cards are now only providing one.

As the ability to obtain credit diminishes, the loss of float through

debit cards and preauthorized transfers may be more acceptable to the average consumer. Americans might even equate EFT usage with the President's plea for citizens to live more within their means.

Bankers are also recognizing the need to sell EFT to the customer if it is to gain widespread acceptance. For example, telephone bill paying is being marketed as a major step toward implementation of a wide range of home banking services. These include preauthorized transfers, stock transactions, retail catalog order entry, educational services and games.

With most of the country's homes containing one or more telephones and TV sets, plus 20% of the nation already receiving cable television, the communications network for such services is almost in place.

In addition, the government is attempting to preserve consumer rights. Members of Congress and the Federal Reserve have aggressively sought consumer protections in electronic banking. The congressional Office of Technology Assessment is reviewing security procedures. The Justice Department is investigating ways to define and classify EFT crime. And the U.S. Office of Consumer Affairs is performing studies on equal access to EFT for the poor and handicapped.

Nevertheless, it is safe to say we will be using checks for a long time. There will be no checkless/cashless society in the near future.

But as one industry observer remarked, "The blue-sky, gee-whiz world [of EFT] is being put in place." One might add that it is rapidly being put in place.

Improved System Technologies Inc.

A Step Forward in Database Design

Dear Colleague:

I'm excited about the new database design methodology which has been developed by Learmonth and Burchett Management Systems in London.

Based upon analysis of data into its simplest form (third normal form), as IST has advocated for some time, the LBMS approach presents a series of tested rules for generating a "first-cut physical design" of a database under IMS, ADABAS, IDMS, and other DBMSs, followed by a systematic performance analysis with optimizing techniques to arrive at a design which meets required objectives.

This LBMS methodology is, in my view, the solution to a problem we have been wrestling with for some time. It fits exactly with IST's methodology for structured analysis/design, based upon logical data flow and data structure analysis.

Accordingly we have arranged for LBMS to present seminars on their techniques in North America. In the next few months, we shall be holding five-day public seminars as follows:

June 16-20	Newport Beach	August 4-8	New York City
June 23-27	Chicago	August 11-15	Toronto
July 14-18	Cleveland	September 15-19	Philadelphia
July 21-25	Boulder	September 22-26	San Francisco

In these Structured Database Design seminars, principals of Learmonth and Burchett Management Systems will present their techniques, show how they can be applied to the major DBMSs, and lead participants through a realistic case study.

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Sincerely,

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Pender M. McCarter is a Washington, D.C.-based editorial consultant with more than 10 years' involvement in computer and information-related issues.

In 1975, McCarter founded one of the nation's first EFTS newsletters, "EFTS - Industry Report." As a member of the American Federation of Information Processing Societies, Inc.'s Special Committee on Electronic Funds Transfer Systems, he presented comment on the Federal Reserve Board on Regulation E.

McCarter was recently named a partner with Credit Research, Inc. of New York, publisher of CARD, a policy analysis and research paper for credit card and EFT executives.



Vincent van Dumb.

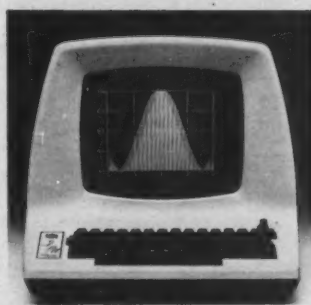
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EDITORIAL

A Unifying Objective

Underlying the debate on Capitol Hill over rewrite of the 1934 Communications Act, and the Federal Communications Commission's Second Computer Inquiry, and the Justice Department's antitrust suit against AT&T, is the issue of whether — and if so, how — to restructure the Bell System.

Ideally, this restructuring would unleash the full power of Ma Bell's innovative talents while increasing competition. However, since the battle over the legislation is also a battle over who gets how much of a large and rapidly growing pie, less lofty interests have tended to dominate the discussion.

Meanwhile, a largely unseen hand has been reaching over the shoulders of the squabbling Congressmen and lobbyists. Japan, France, Britain and Canada all have established government-industry consortiums to develop new telecommunications hardware, software and systems. Each of these efforts is lavishly fertilized with public funds.

A major goal, in every case, is to sell the new products in the U.S. In the case of telephone terminals, transmission equipment and data terminals, foreign manufacturers have already gained a significant market share.

Congressman Lionel Van Deerlin (D-Calif.), chairman of the House subcommittee now wrestling with one version of a new communications policy bill (H.R. 6121), alluded to the foreign threat a few months ago [CW, March 24]. His basic point was that foreign telecommunications manufacturers, backed by government money, "may be fatally wounding" the U.S. telecommunications industry at home as well as abroad.

Van Deerlin contends that Bell Laboratories and Western Electric Co. each must be left whole and "unseparated" — so they can compete effectively in international telecommunications markets.

But another approach would be to provide, in the pending legislation, for a government partnership with all U.S. suppliers of on-line services and systems — one that could spur development of innovative technology capable of competing with the imports.

As we see it, most or all of the money would come from the U.S. Treasury Department, and most or all of the direction would come from senior industry types having both marketing and technical expertise. It may be naive to propose a cooperative venture like this, given the present rivalries within the U.S. telecommunications industry. On the other hand, unless some unifying objective emerges soon from the present dog-fight over market share, all of the combatants may end up with less pie than they anticipate.

DATA PAST

Five Years Ago May 7, 1975

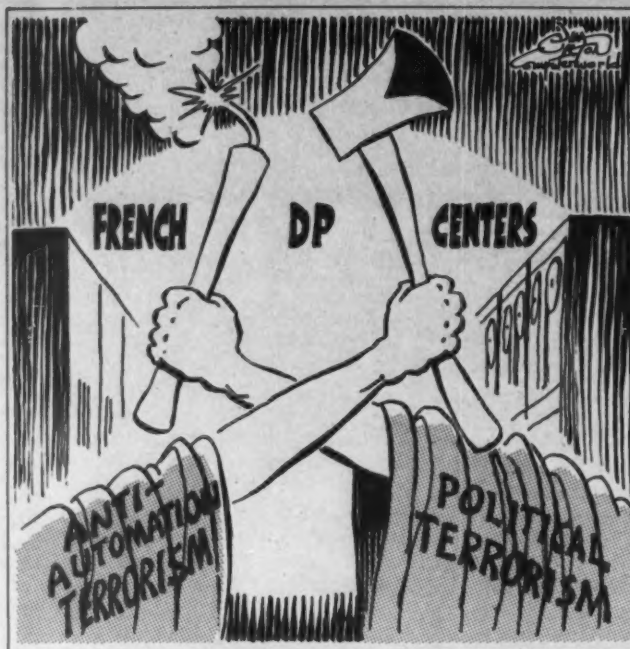
SAIGON — Two computer specialists acting as advisers to the South Vietnamese government were among the last Americans to leave the city just hours before President Duong Minh surrendered unconditionally to the Provisional Revolutionary Government (Viet Cong). Employed by the California-based Computer Sciences Corp. (CSC), the two members of the CSC team of 12 in Saigon closed their advisory office to the Government of Vietnam Computer Center when other nonevacuation-oriented U.S. operations terminated on Monday, April 28, 1975.

— — —
WORTHINGTON, Ohio — An air safety critic charged that chances for

midair crashes between passenger planes would increase unless the Federal Aviation Administration slowed implementation of its radar data processing traffic control system.

Eight Years Ago May 3, 1972

WASHINGTON, D.C. — The demise of RCA's computer business was the major spur to renewed antitrust action against IBM by the Department of Justice. The department, in a little-noticed filing in January with the U.S. District Court for the Southern District of New York, indicated that other mainframe companies might follow RCA and General Electric Co. out of the business if the suit were not settled quickly.



Fearsome Partners

LETTERS

Economics of EMS

I read with interest the GTE Telenet Communications Corp.'s article by Phil Hirsch describing John Peters' announcement of electronic mail service (EMS) [CW, April 7].

Most of Peters' statements concerning costs of existing communication services vs. Telenet's EMS are impossible to verify. However, one assertion, upon which much of the economics of EMS is based, is that "three out of every four telephone calls go uncompleted on the first attempt."

As a matter of fact, Peters' assertion is incorrect. Call completion analyses show it is the exact opposite. That is, more than 80% of all business calls complete on the first attempt.

It would seem that if Peters is basing the economics of an EMS on the fact that three out of four calls do not complete, he has a long way to go to economically justify his service.

C.J. Many

General Manager

Network Administration
New York Telephone
New York, N.Y.

Cloak of Anonymity

I was more than a little disturbed to read the first letter in the April 28 issue, entitled "The Real Schism," and note that the name of the author was "withheld by request." In that letter, the Association for Computing Machinery (ACM) and, by association, much of its membership were accused of favoritism towards an (unnamed) computer vendor, as well as heavy-handed tactics to protect the "establishment."

Significantly, the one individual actually named, Herb Grosch, has taken his dissatisfaction with some of the established policies of ACM to the ACM Council, which is the only way to really accomplish anything. What will

result is only conjecture at this point, but at least Grosch is acting openly and takes full responsibility for his actions.

More disturbing than the cloak of anonymity used by the letter's author, however, is *Computerworld's* decision to print the letter without insisting that its author be identified. This to me is a clear example of unethical behavior, and I fail to see how we can instill a sense of ethics in new people in our ranks if one of our leading publications so ignores its responsibilities.

John H. Esbina

Perrysburg, Ohio

Benchmarks Welcomed

I wanted to let you know how impressed I was after reading the benchmark article on the Wang Laboratories, Inc. 2200 [CW, April 21]. I am currently in the process of selecting a new computer system, and going through vendors' literature is time-consuming to say the least.

Many new publications claim to keep one up-to-date on equipment and help reduce required reading. I'm glad to see *Computerworld* contributing to that effort.

Kathie Larrabee

Murray Hill, N.J.

IBM 5110 Performance

In regard to your recent articles on small computer benchmarks, what does IBM have to say about the poor performance of the 5110 in comparison with other systems in its class?

Philip N. Sussman

New York, N.Y.

Computerworld welcomes comments from its readers. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

HUMAN CONNECTION

Jack Stone

Consultants Building Professional Recognition

Let's hear it for the Independent Computer Consultants Association (ICCA) and its leader, Steve Epner, a group determined to expand the legitimacy and professionalism of computer consultants. Their endeavors should reap considerable rewards for many, since the consultants' performance over the years has, quite frankly, been viewed with mixed emotions by their clientele.

The ICCA, a not-for-profit organization founded by Epner in 1976, believes that by banding together, consultants can help promote understanding of their own roles in the information system business and provide improved service to the industry. In addition, the association has established a code of ethics for its members and is committed to enforce it through revocation of membership for noncompliance and resolution of client problems along the lines of a "Better Consultant Business Bureau."

Finally, the association is providing — through its "National Directory of Computing and Consulting Services" and in other ways — the means to help potential clients identify consultants with the background and experience for successful engagements.

Epner recently had this to say about the ICCA:

"Consultants are becoming more and more important to the DP industry. Of course, their assignments are not intended to replace the jobs of the in-house staff, but rather to supplement them in times of special need."

"Most consultants support three categories of needs. The first category is that of special technical skills in short supply, such as operating system software or telecommunications systems

support. The second pertains to the peak load requirement for additional staff with relatively conventional skills. The third is the desire for an outside viewpoint, one which provides a fresh perspective not tainted by internal politics.

"We organized in 1976 because we felt that the industry clearly needed an association. We have grown quickly, and now I think it's fair to say that we are known throughout the consultant industry. On behalf of our members, we interface with hardware vendors, provide educational seminars, publish articles and a quarterly newsletter, hold an annual conference and even participated in the White House Conference on Small Business.

"We feel our code of ethics is the foundation of our goal to promote professionalism among computer consultants.

"Provisions of the code, briefly stated, are these:

- Consultants will not express opinions or make recommendations unless acting independently, in the sense that the consultant has no undisclosed special interest in a client's decision.

- Consultants will take on only those assignments that can be completed with professional competence.

- Members will not knowingly misrepresent facts or subordinate their judgment to others.

- A member will not disclose confidential information obtained during a client engagement without client consent.

- Consultants will not act in a manner discreditable to the profession.

"The ICCA National Directory of
(Continued on Page 34)

READER COMMENTARY/D.J. Crowell

Most DP Managers Don't See Job as Dreary Grind

I am not often motivated to respond to opinions expressed in articles or letters. However, when I find negative generalizations about our profession made by an experienced and well-known individual with whom I disagree — and when I interpret those generalizations as bordering on insulting our intelligence — I must respond.

I refer to Jack Stone's column entitled, "Second-Class Image Hurts DPers" (CW, April 12). In his opening statements, he generalized that DP directors' compensation suffers significantly in comparison with other positions of "comparable responsibility." I have no way of determining his "comparable responsibility" criteria, but in the few organizations with which I am familiar, such a comparison based on organizational levels does not embarrass the DP'er but, to the contrary, somewhat compliments him.

Also, most managerial-level DPers I know don't describe their jobs as dreary grinds. Most DP managers and directors I know are very happy with their jobs and find the daily challenges invigorating. The many competent people I know are intrigued, and sometimes swamped, by just keeping up with the state of the art in our evolving area. No other area of business can present such a variety of problems which can be resolved in such an ever-expanding number of ways.

I agree that the evolution of the recognition of DP's importance in most businesses has been slow. This is historically true of most new

business functions. It is up to us to "sell" our chosen profession through continued demonstration of its capabilities. The profession will be rewarded in due time by attaining its proper role in the hierarchy.

The childish suggestion that the DP department shut down to demonstrate its importance to the organization may focus attention on the function but will not improve its image. The same thing can be said of almost any department, including the mail room.

With such suggestions as shutting down the department to attract attention and with such attitudes as referring to their jobs as a dreary grind, it is no wonder some organizations view their DP function as second class. It is obvious to me they are! In my experience, such departments and people are mostly figments of some fiction writer's imagination, and if they do exist at all, are, fortunately, a rarity.

Looking back over just the last 10 years, one finds many good examples where the role of DP in certain businesses has received its proper recognition. We should take heart in such progress and continue to advance the cause by demonstrating DP's importance in the organization. This can only be done by reliably performing our functions and continuing to demonstrate our capabilities to aid in the operation of the business.

Crowell is corporate director, computer/communications, at National Gypsum Co. in Dallas.

READER COMMENTARY/Scott Upp

Money One of Last Reasons DPers Change Jobs

If you think the turnover in your DP staff is primarily because of money, you're missing the boat.

Contrary to popular belief, one of the last reasons DPers change positions is money.

DP professionals are in a high-demand, low-supply situation; the income brackets of these professionals are going up somewhere between 10% and 12% a year, and most corporations are keeping pace with this trend. However, in working with this specialized group over the years, we have uncovered some very definite reasons DP personnel do change jobs:

- **Communication:** One of the biggest frustrations of the DP professional is communications. And it's not that he isn't able to communicate with his bosses or workers — it's much broader than that. The problem is, he is communicating only within a very small segment of the company. He isn't sure what the corporation is trying to do, what his relationship to its goals are and where he fits.

Someone isn't communicating with him. Therefore, he looks for the or-

ganization that can provide, through good communications, the definitions and goals he needs to feel he is an integral part of the company, performing an important function.

- **Technology:** This might also be described as keeping up with the state of the art. It is true some DP professionals in large, sophisticated departments move to environments that have less sophisticated technology, where they can have more visibility. But these are the exceptions rather than the rule.

In the DP industry, the technology changes so quickly that keeping up with the latest equipment, software and the various software interfaces is an important career goal. Today, the young professional recognizes his long-term growth is dependent upon knowledge of developments in telecommunications and data base management. If his present employer is neither entering into these areas nor keeping up with the state of the art, or if the employee isn't exposed to it by his company, he'll look for it elsewhere.

- **Business Development:** While in general, the DP professional finds it necessary to advance his knowledge of technical skills, many DPers are also looking to broaden their overall business development. For example, we find people who have been in one phase of business, such as insurance, feel the need for diversification and move into the DP phase of manufacturing or retail distribution. In the multifaceted, diversified corporation, employers should give serious consideration to moving their people from one operation to another, if they find their DP professionals need this kind of "business development" for personal and professional growth.

- **Growth and responsibility:** It is an unusual person in DP or any other profession who doesn't want to expand his responsibility and authority after he has mastered his present skills. This is true from programmers to high-level managers. One of the biggest reasons people change jobs is to move up and function at the next level. And one of the biggest mistakes employers make is not recognizing and

doing something about this basic need to advance.

- **Recognition:** DPers need visibility. They need a feeling of importance when they accomplish something. They need recognition! Too many corporations have lost sight of that need. But in today's DP market, acknowledging a job well done could mean the difference between keeping or losing a good person. On the positive side, it is not uncommon today to find that the head of DP is a company vice-president. This is the corporation's method of recognizing the importance of the individual.

The days when DP was thought of as an isolated company function are waning. DP is the only function that goes across all lines of business and interfaces with every single department.

The DP professional realizes that all five areas — communication, technology, business development, growth and responsibility and recognition — are vitally necessary if he is to be successful, progress and stay with his present company. The corporations
(Continued on Page 34)

SOCIOLOGY OF COMPUTING/Robert L. Glass

An Overdose of Trivia

When I think back on it, I'm still surprised we managed to pull the whole thing off.

I mean, there we were, our feet being held to the schedule fires of the Simpro Propellant Simulation system implementation.

Yet in the midst of that, we managed to pull off an elaborate practical joke which exposed us all the way to the top level of management.

The time was 1965. The place was Alchemy Chemical Co., a company as

singularly unhumorous as only a rocket propellant manufacturer can be. And the people? Well, there were:

- Lars Tensile, a very bright but somewhat stuffy young programmer.
- Midge Boulder, an impish and pert secretary.
- Frank Stolid, a manager who will be present in this story by proxy only.
- Me, Lars' lead and a promising programmer (I blushing recall) with more chutzpah than good sense.

Frank is the manager of the Simpro

project, as well as a host of other scientific propellant-oriented programs. Midge is his secretary. I am the Simpro lead, and Lars is one of four programmers working on Simpro under me.

Progress Reporting

Alchemy's method of management at that time was progress reporting. Each person on Simpro would turn in his progress report to me, and after I had scanned and reacted to the reports, I would pass them on to Frank via Midge. Frank, in turn, would winnow out the dull and unimportant, merge our progress report with those of his other leads and send the result to his boss.

This process was then repeated, non-recursively, on up the management chain. To the Top, where God sat in judgment on the accumulated hierarchy of reports. So far as we knew.

One day Lars, who had spent half of the week fighting off a bad case of programmers' dysentery and had been virtually valueless, felt compelled to turn in a progress report anyway.

I glanced at the piece of paper disinterestedly, knowing he had zilch to report, and a couple of words caught my eye: Matval and Outkon. Now Matval and Outkon, I happened to know, were two trivial subroutines which effectively were the 1965 equivalent of top-down programming stubs. I studied the piece of paper more thoroughly.

"Subroutines Matval and Outkon," the report said, "are now 83% com-

plete. Test cases are being constructed and should be fully integrated by next week."

Period.

I looked back up at Lars. He smiled weakly. I decided to let him off the hook. "OK," I said, "thanks for the report." He left.

A brilliant and devious flash burst upon my brain. The proper way to handle Lars' report was to ascan it, right? But on the other hand, why not have a little fun with it?

It will come as no surprise to you that when my own report to Frank went out, Lars' stunning progress on Matval and Outkon was duly noted. That, I thought, will be kind of funny and a nice humor break for the schedule-troubled Simpro team.

It will come as a surprise to you — at least, it did to me — that Frank included the Matval/Outkon item in his own report to his management. Now that was a twist to the practical joke that I hadn't anticipated. And the implications were staggering.

One implication was that management was totally out of touch with the implementation details of Simpro.

The other implication was more perplexing. Somewhere up the management ladder between the Peons and the Top there is a drifting cloud layer. It sometimes moves up a little and it sometimes moves down a little, but it is always there. Beyond that layer, we Peons do not really have visibility. Now the reason this is important to my story is that the Matval/Outkon funny balloon had just drifted up into the cloud barrier. Who knew what might happen next?

Monthly Forum

One of the neatnesses of the Alchemy Chemical organization in those days was the Management Technical Meeting (MTM).

Management had established a monthly forum for the presentation by technologists of significant technical achievements. Managers attended MTM on their own volition, but quite a few came. We Peons felt, in those moments, that we achieved some penetration of the cloud barrier.

The link between MTM and this story is via the one character who has yet to appear on our stage. As a practical joke, I formulated the idea to prepare an invitation to Lars to speak at the MTM. And his subject? You guessed it — Matval and Outkon. It made sense; if the Matval/Outkon progress report happened to catch the eye of some postcloud manager, why could he not issue a request from On High for further information?

Except for one problem: What form should the invitation take? Enter Midge, our so-far unused character. When I let her in on the joke, she was delighted. "I'll type up an invitation," she said, her eyes twinkling.

Midge did a beautiful job. "You are cordially invited," the memo innocently began, "to make a presentation to the Management Technical Meeting May 21, 1965, on your work on Matval and Outkon. Please address significance of these two products to overall corporate goals, as well as system sta-

(Continued on Page 34)

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THE TAYLOR REPORT/Alan Taylor

Unreasonable Contracts: Lawyers Can Help

Three tests for reasonable contracts — and a vital qualification — were given in the March 10 Taylor Report, and attorney David J. Connelly later commented that while correct, the tests had not gone far enough ["Beware of Limit-of-Liability Clauses," CW, April 28]. In fact, the qualification (see point No. 4 in box) would catch any such clause, since a limit-of-liability clause would be regarded as capable of ef-

fectively cancelling either or both the system description and delivery time contractual promises, even if they were included.

After some DP contracts are signed, system delivery promises (both hardware and software) are not kept, system descriptions are violated and the DP manager is left to cope with the situation as part of the standard of computer life! But there are some standards

of business law, including those mentioned by Connelly, which may be able to provide some protection and do so economically.

When management has signed an unreasonable contract, the next step is really up to the lawyer trying to protect whatever rights the user has left. As Connelly pointed out, some of the contract terms may not be legal in any circumstance. Others may depend upon the way any later damage is caused.

However, the lawyer should not talk about unconscionability or other legal theories. Such discussions may educate DP managers or management, but won't give them the guidance they need. Instead, if the user's rights are to be protected after an unreasonable con-

Contract Pitfalls

A DP contract is unreasonable if any of the following is true:

- 1) It doesn't include a real system description.
- 2) It doesn't include definite delivery promises.
- 3) It doesn't include definite ownership rights to software and/or software licenses.
- 4) It includes any tricky language which forgives breaches of system descriptions, delivery promises and so forth — or which makes the purchased product or service unmarketable or unusable. Examples include clauses limiting liability, requiring consent to resell or permitting spare parts and/or maintenance to be withheld from original or later owners.

manager can get his teeth into. He isn't asked to understand the possible legal theories regarding unconscionability, public policy or anything else. The lawyer gets the documentation he may need later in

about these contracts leave the DP manager on his own. The next step, in the process of real-world contracts, is for good direction to become available to most of us, who have signed, and will sign, un-

'The lawyer should not talk about legal theories. Such discussions may educate DP managers, but won't give them the guidance they need. Instead, if the user's rights are to be protected, the lawyer should give direct and simple guidance.'

tract is signed, the lawyer should give direct and simple guidance.

For example, a contract may permit part of the system to be shipped, demand that this part be paid for immediately but never require the vendor to send the whole system (it's not unusual). The lawyer's questions and advice might go as follows:

- Did you ever tell the vendor which pieces were vital to the use of the system? (If in writing, send copy). What response(s) did you get?
 - Were you told that deliveries were or were not being held up or how you would be notified in the case of delay, schedule approval or schedule change? (Please keep records of all verbal or other notifications.)
 - What deliveries are you expecting?
 - Ask for delivery confirmation for all the system at monthly intervals and tell me if delivery is significantly delayed or any vital parts are missing.
 - Be prepared to pay all invoices, even for parts you cannot use, as per the contract.
- Now there is something a DP

case of disputes, and the user is put on notice that bills may have to be paid even if the system isn't working. It may not be what the DP'er would like to hear — but that's part of the price of signing an unreasonable contract.

Unfortunately, the letters that I have seen from lawyers

reasonable contracts.

I am not saying that the foregoing questions are the correct ones. But the style is what we need.

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Danger in Assessments

In response to the March 24 Human Connection article "DP Managers Must Assess System Practicality," I should point out that DP managers will not always be thanked for such assessments. I personally know two DP managers who were downgraded after advising management that major new user-designed systems would not work as specified and offering alternatives. Each was ignored and replaced by a non-DP "professional" manager who would "get the job done." Neither system worked — not because of DP problems, but because of the exact user interface problems predicted by the former DP managers. Results? The demoted DP managers quit and the Non-DP managers were promoted (after all, it wasn't a DP failure).

The current emphasis on non-DP "professional" managers and "user-run" projects will make these situations more common.

Generally, bridges are not built if Engineering says they will collapse. It's too bad management won't always give similar consideration to DP assessments of computer projects.

D. Paul Murphy
Houston, Texas

Standards Effort

An article entitled "Intelligent Terminals' Value Seen Hinging on Standards" [CW, March 31] contained statements which indicated to me that the persons quoted did not know about the efforts of two Ansi subcommittees.

Under Ansi X4, "Office Machines and Supplies," subcommittee X4A12 is working on "Word Processing." Under Ansi X3, "Computer Languages," another subcommittee, X3J6, is working on "Computer Languages for the Processing of Text." Additionally, there is an international standardization effort under ISO/TC95 and TC97.

In this area where research results to aid design decisions are just now becoming available, premature standardization could prove disastrous. We might find, as suggested in the article, that "a high-level language similar to Cobol" is adopted!

I attended the last X3J6 meeting as an observer. I found that the volunteer members have put a great deal of effort into this committee. The schedule indicates that

LETTERS

ratification of a standard, easy-to-learn-and-use language for the processing of text is at least two years away. Clearly, development of a standard which can be used by a wide variety of people on a wide variety of devices is a difficult task.

The secretariat for both Ansi committees is the Computer and Business Equipment Manufacturers Association (Cbema), Suite 1200, 1828 L St. N.W., Washington, D.C. 20036.

Heidi N. Jacobus
Dallas, Texas

DP Crime

In a recent article "DP Crime Bogus Issue" [CW, March 10], computer crime was called a rare and insignificant problem, and it was said that "current legislation adequately addresses the issue." In an accompanying article, "Congress Told Computer Crime No Real Problem," the same individual, John K. Taber, stated what he felt a "true computer crime" is.

I would like to suggest the following to Taber:

- Most companies will not

make know that they have been subjected to computer crime. This makes risk analysis of computer crime difficult if not impossible.

- In order to adequately secure a system you must have both adequate internal and external controls. With this in mind, I cannot agree with Taber's idea of what computer crime is since the computer plays a major role in such exposures.

- Since it is extremely difficult to find computer crime, it is possible that a great deal already exists and has existed for quite some time without anyone's knowledge.

- With the advent of higher level languages for the non-DP professional, the risk of computer crime seems greater than ever.

- New technology, both hardware and software, should consider security in its design and application. At present, this is not the case.

- Most DP installations are growing too fast. Their present security measures are outdated and at times security is not even addressed.

These are just a few of the fundamental problems that should be considered when addressing computer crime. Though I do not agree with Taber, I don't wish to discredit him either. There remains the possibility that he is correct. I just don't understand how he can be so sure that computer crime is no real problem when any risk analysis is virtually impossible. I think there is too much at stake here for gut feelings.

Michael A. Bingle
Edison, N.J.

Other letters on Page 34.

AND IN THIS CORNER/Kenniston W. Lord Jr.

Angels of Death?

Two reports crossed my desk one day recently: one pleasant, one alarming.

I learned of a blind man who had been connected by electrodes to a computer. Scientists were able to generate brain waves that caused the blind man to "see" an image in his mind's eye. Such use of the computer represents but one possible means whereby we will benefit mankind, given time, effort and imagination.

nation.

The other more disturbing report had to do with a group of people wagering on the precise time of death of patients in a critical care facility. Seems that these people would alternately turn life support equipment off and on and then gamble on the precise time of death of the patient. And it caused me to once again ask myself something which concerned me intensely five years

ago: Could a computer be used as the delivery vehicle for death to a critically ill patient? Could the computer be the "Angel of Death"?

If a person can turn a life-support system on and off and that system not report the action with alarms, could a computer do the same thing? Could a computer or microprocessor which is central to a patient-monitoring system function in this manner and go reasonably undetected? Since the patient who is connected to such a system is connected by electrodes, could the computer that "reads" the vital signs (which is, after all, a flow of electricity) also "write" a flow of electricity to deliver the final coup de gras?

Suppose the programmer who developed the patient-monitoring application believed in euthanasia? Who's to stop him? Suppose the programmer were to include a random number generator in his program to cause such things to happen "just for fun." Or worse, suppose one or more people were sick enough to cause a patient to die for the suspense of the wager. Who controls the development of the application? Who ensures that such cannot and could not ever happen? Who is looking?

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On Programmer/Analysts

So many positions in DP today are listed as in the category of analyst-programmer. So many DP departments require their analysts to do heavy programming too, even though the job title does not carry the programmer tag with it.

DP management argues you get more bang for the buck from an analyst-programmer who serves in this dual-function capacity. And DP management looks upon analyst-programmers as the panacea to finding qualified personnel. Indeed, the analyst who is unwilling to do programming is looked upon as an unsuitable employee.

But are there fallacies in the assumptions behind the analyst-programmer job titles and requirements? And what successes are firms having with analyst/programmer types of jobs?

A number of points come to the fore in considering this question.

Is in analyst/programmer an analyst who does programming or a programmer who does analysis? These two jobs and the skills required are not compatible; the focus of the two differs so sharply they lead down divergent paths of skills, talents and abilities. What mix of activities does the analyst/programmer perform? How many people are very expert and dedicated to both roles? Is it not the very rare person?

When DP management sets up analyst/programmer jobs, does it expect the person to be mostly an analyst or a programmer?

It is only the very rare DP'er who does

LETTERS

not have strong leanings to either analysis or programming. This means that seeds of employee dissatisfaction are sown as soon as such jobs are filled.

When it comes time for DP management to give a "performance appraisal" of the analyst/programmer types, how are they judged? Since the two roles are in fact conflicting and opposite paths with opposite focal points, the employees (excluding the rare ones who thrive, or at least adjust to playing both roles) are in perpetual conflict, as are the managers trying to appraise their performance.

What results from these conflicts? Doesn't the dissatisfied person eventually seek new employment more closely aligned to his stronger tendencies and skills — either those of an analyst or those of a programmer?

Are there still firms that hire analysts for their skills in analysis and management-oriented roles and do not require their analysts to do programming? And does DP management at such firms also recognize that high-level programming jobs are needed for those who are enthusiastic about programming?

If there are any such firms, I for one would be glad to hear from you.

John Callahan

Terre Haute, Ind.

Important Service

Computerworld's current series of benchmark reports is most interesting and terribly important to those professionals that must make tough decisions in procuring proper computer for their systems needs.

I commend CW on its decision to provide its readers this important service.

Elmira, N.Y. Samuel L. Leonard

Overdose of Trivia

(Continued from Page 29)

us."

I could hardly wait for the missive to be laid on Lars. Midge volunteered to do that piece of pseudo-dirty-work, too. It's too bad the printed word can't record photographic images of transient moments in time. Lars' face was like an unsynchronized silent film of emotional reactions, flickering one after the other with millisecond separation. When he hit the word "presentation," his face lit with pleasure, but as he reached "Matval," his jaw rocketed down toward his kneecaps. By the time he came to "overall corporate goals," his knees were wobbly and he reached for a nearby desk to steady himself.

Lars crept back to his desk and nursed his dilemma for about 15 minutes. Then, one by one, the now-

informed Simpro group gathered about him. "What's wrong, Lars?" asked one of the team innocently. And as Lars choked out an explanation, the laughter exploded from the team like the ignition of a runaway rocket.

Lars' expression reversed the sequence of the invitation. His depression, badgered by our laughter, switched into anger. And then, as the general merriment increased with the pitch of his anger, his alert mind grasped what had happened until finally the laughter of relief pealed in deep thunderclaps from the depths of his now-freed soul.

For a little while, the schedule pressures on Simpro had been forgotten.

Funny thing. I don't remember much else about Simpro. But I sure remember the joke we played on Lars Tensile.

Group Building Recognition

(Continued from Page 30)

Computing and Consulting Services has proven to be a useful tool for the business, educational and governmental communities. It has helped many installations find the proper consulting resources for a broad range of project needs. It includes a listing of consultants by Zip Code and an alphabetical cross-reference list to make it easier to find specific skills and is available to the public for a nominal charge.

"At ICCA 80, this year's national conference, which was held in St.

Louis on April 24-25, the association provided its members with special seminars on subjects relating to the consultant business in the '80s. Based on the response to Jack Stone's seminar at this meeting, the association has chosen 'The Human Connection' as the theme of the ICCA 81 conference (May 7-8 Las Vegas)."

Readers interested in presenting papers at the ICCA 81 Conference are invited to contact Steve Epner for further information. The association's address is P.O. Box 27412, St. Louis, Mo. 63141.

Why DPs Change Jobs

(Continued from Page 29)

that also recognize these necessary ingredients for employee development are getting and retaining the best people. Those that are not are losing them.

After these ingredients comes the final reason DP professionals change jobs — money. If the five basics for success are there, the money will come at a pace commensurate with their growth. However, it is not a prime factor in job change decisions.

Upp is president of Data Base Consultants, an executive search firm specializing in DP professionals.

NYU SYMPOSIUM ON DISTRIBUTED PROCESSING PRACTICE May 15 and 16

The symposium will feature experts from business and universities who specialize in the design and implementation of distributed processing systems.

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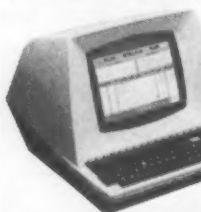
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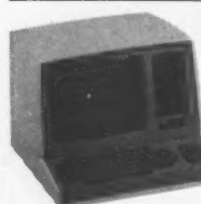
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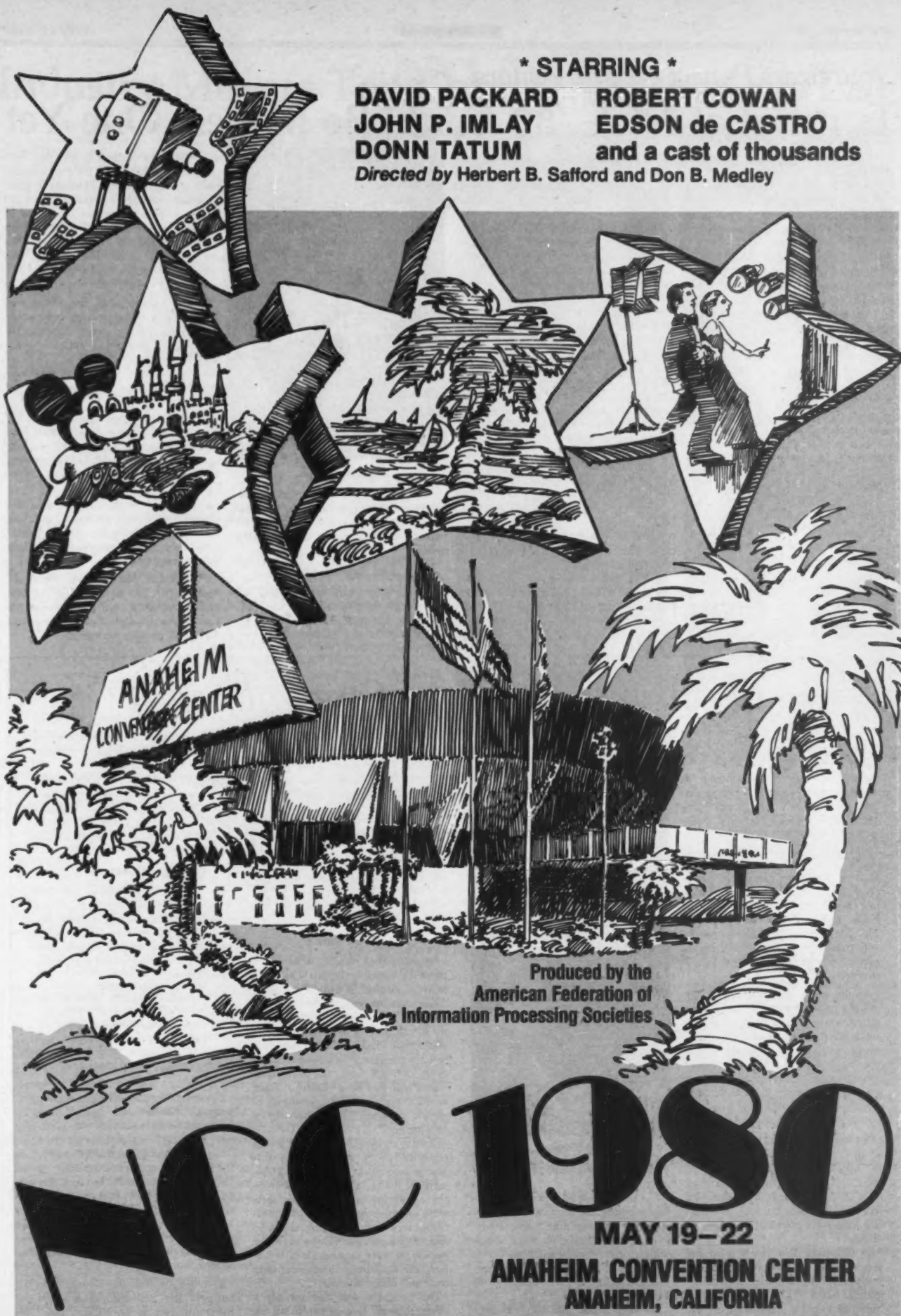
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Organizers Expect 80,000 Visitors

Turnout at NCC '80 Could Be Biggest One Yet

By Jeffrey Beeler

CW West Coast Bureau

ANAHEIM, Calif. — Hermits, the Qantas koala bear and other loners would probably do well to steer clear of this year's National Computer Conference.

Between the time the show's doors swing open on May 19 and the time they close again four days later, more than 80,000 visitors from throughout the U.S. and around the world are expected to surge across the threshold, according to NCC's overall conference chairman Herbert Safford.

Originally, conference organizers had expected a crowd of only about 70,000, but with advance registrations up almost two-fold from last year, show officials have been forced to revise their estimates upward. If the new projections prove to be accurate, NCC's 1980 edition will draw the largest turnout in the show's seven-year history, even larger than last year's record attendance in New York.

This year's NCC will offer a little something for just about everyone, but if you are coming to the conference in search of solitude, you might want to reconsider your travel plans.

The sheer enormity of this year's expected crowd has forced NCC officials to reexamine some of the conference's

management and organizational procedures, Safford said. One subject on which they have particularly focused their attention is opening day registration.

In 1978, the last time NCC met in the Anaheim Convention Center, opening-day registration bogged down so woefully that the backlog of unregistered guests filled the facility's entire foyer for hours. "If such a serious bottleneck could result from an attendance of only 55,000," this year's conference organizers have asked themselves, "wouldn't the problem prove even worse with a turnout of 80,000?"

To avoid a repetition of their experiences two years ago, NCC officials this year are trying harder than ever before to encourage as many visitors as possible to register early. To that end, they plan to throw an "early-bird registration party" from 6 p.m. to 9 p.m. on May 18, one day before NCC 1980 formally opens.

The party — the first of its type in NCC history — will lure potential pre-registrants with a combination of free entertainment, snacks and drinks, Safford said.

As a further aid to registration, conference officials have recently renegotiated their contract with the show's long-time supplier of visitor-identification badges. The contractual



Herbert Safford

changes will give conference organizers greater leeway than in the past to expand or otherwise modify their registration facilities to suit changing needs.

And Then the Show

But although efficient registration ranks high on Safford's list of NCC priorities, so does strong show content.

In both its technical program and product exhibit, NCC 1980 addresses a wide enough span of interests to gladden the heart of even the most eclectic DPer. Whether you are interested in gaining a few user tips, brushing up on current industry trends or just copping a peek at the latest wares, this year's conference will probably have something to suit your tastes.

On its exhibit side, the show will boast nearly 600 computer companies displaying nearly every conceivable type of DP product in approximately 1,600 booths. The show will also include a Personal Computing Festival, which will account for another 100 exhibitors.

On its conference side, meanwhile, the show will offer — among other features — a series of plenary session speakers addressing NCC 1980's overall theme, "New Directions for a New Decade."

In keeping with that theme, the show's conference program will pay special attention to the new technologies likely to dominate the computing field during the next 10 years.

In particular, the program will stress "hot" topics like data communications and networking, information-resource management, distributed processing and small business systems.

Technical Sessions Streamlined

By Jeffrey Beeler

CW West Coast Bureau

ANAHEIM, Calif. — "Small Is Beautiful" — or "Less Is More" — would probably prove a fitting slogan for the technical session program at this year's National Computer Conference.

Since the last NCC almost a year ago in New York, the show's conference program has gone on a crash diet — and the signs of weight loss are everywhere. The familiar NCC miniconferences, which in The Big Apple drew light crowds and heavy criticism, have been eliminated entirely from this year's conference lineup.

At the same time, several of the show's panel discussions have been pared, and some of its parallel sessions have been consolidated to remove overlap and minimize schedule conflicts. The result is a sleeker more streamlined show, with a conference program that this year boasts only 104 technical sessions, compared with last year's 155.

But what NCC 1980 may have lost in size, it has more than recovered in increased quality, according to NCC 1980's Program Chairman Don Medley. Indeed, improved technical session content is what this year's program cutbacks are all about.

By stripping this year's technical sessions of excess poundage and scrapping superfluous ones altogether, Medley and his colleagues hope to avoid a repetition of last year's NCC-program debacle.

Many of that conference's allegedly most appealing technical sessions played to nearly empty houses.

Much of the blame for last year's paltry session attendance, Medley explained, lay in the technical



Don Medley

program's sheer volume and complexity.

"At the New York show, the conference program contained so many parallel sessions that many attendees couldn't make up their minds which ones they wanted to go to first," Medley said. "As a consequence, many of them didn't go to the sessions at all."

To avoid making the same mistake again this year, NCC orga-

nizers have discarded the dross from many of last year's weakest sessions and combined the remaining material to produce a conference lineup that stresses quality over quantity.

"If you have three good speakers in three different sessions, that's one thing, but if you can put all three in the same session, you're going to have a strong session," Medley said. "That's the kind of approach we've tried to take for this year's conference."

User Focus

As with past NCCs, this year's technical session lineup has been heavily slanted to appeal to users. "The vast majority of our sessions in Anaheim will focus on the usability of computers as tools," Medley explained. "In organizing our conference program, we tried to look at every session and ask ourselves, 'How will this be of help to users, whether they're DP professionals or people working in engineering or accounting?'"

Of the more than 100 DP topics expected to be addressed in this year's technical session program, some of the most important will include programming languages, software engineering, the role of minicomputers and microcomputers in distributed processing, the expected impact of very large-scale integration, DP auditing, transborder data flow and office automation.

The program will also include a "very topical" session exploring the role of computer simulation in solar

energy and, for vendors, a seminar on methods of securing venture capital, Medley said.

To give visitors a chance to attend as wide a variety of sessions as possible, Medley and his colleagues have taken great pains to disperse NCC 1980's "hottest" topics evenly throughout the four-day program.

Special Features

As a partial substitute for this year's defunct miniconferences, the session lineup will also include several "special features" in which groups of two to five related presentations are organized into separate "tracks."

One such track will focus on the role of computers in motion pictures and other segments of the entertainment industry. Another will examine computer applications in medical imaging and medical education.

Elsewhere in the technical session program, Medley and his staff have scheduled a series of half-day seminars ranging in subject matter from "Super Systems for the 1980s" to the "Design and Programming of Parallel Systems with Dynamic Architectures." The half-day sessions will take place during the afternoons and will supplement the show's professional-development seminars, all of which are scheduled for the mornings.

The use of half-day sessions to support the professional-development program is an NCC "first," Medley said.

Industry Movers Top Conference Speakers List

By Bruce Hoard
CW Staff

ANAHEIM, Calif. — An impressive array of industry movers tops the list of speakers slated to appear at the National Computer Conference here next week.

David Packard, chairman of the board of Hewlett-Packard Co., will keynote the conference Monday at 9:30 a.m. with a speech on "The Challenge of the Decade of the '80s."

Following Packard on the rostrum, the noon luncheon speaker will be John Imlay, chief executive officer of Management Science America, Inc., whose speech is entitled "Information Technology: The Industry of the '80s."

Addressing Tuesday's plenary session at 11:45 a.m. will be Edson de Castro, president and chief executive officer of Data General Corp. De Castro's address will spotlight "The Small Computer Phenomenon and its Present and Future Impact."

Walt Disney Productions' Chairman of the Board Donn B. Tatum will speak at Wednesday's 11:45 a.m. plenary session. His topic is "Epcot, Experimental Prototype Community of Tomorrow," a futuristic, and real-life community being constructed by Disney Productions in Florida.

Robert T. Cowan, vice-president of



David Packard



John Imlay



Donn B. Tatum

C. Itoh Electronics, Inc., will speak on "The Impact of a Worldwide Computer Supplier's Market" at the final 11:45 a.m. plenary session on Thursday.

Concentration of Expertise

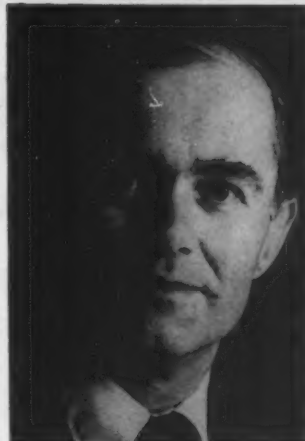
Packard, HP's cofounder and partner, served as the company's president before becoming chairman of the board and chief executive officer.

His public service included a stint as U.S. deputy secretary of defense from 1969-1971, and he boasts a long list of honorary degrees and awards.

Details of Packard's speech have not yet been released. He is traveling in Africa and is not scheduled to return to the U.S. until shortly before NCC.

Imlay, a past president of the Association of Data Processing Service Organizations, will take a lighthearted look at the state of the computer industry and where it is going. His speech will touch on a wide range of topics, including manufacturing, software, computer sciences, word processing and personal computing.

De Castro, considered to be one of the fathers of the minicomputer, will strike a more serious note. He will assess the decline of productivity in the West throughout the past decade and



Edson de Castro



Robert T. Cowan

discuss steps necessary to reverse it.

Among the steps to be covered will be increased investments in advanced computer technology to stimulate industry and provide for the widespread use of computers in offices and homes.

Tatum has presided over Walt Disney Productions during its innovative use of computers in entertainment, es-

pecially in animation and special effects. His speech will describe the use of computers in Epcot.

Cowan has been responsible for establishing computer peripherals activity in North and South America during his tenure with C. Itoh. He will review foreign threats to U.S. dominance of computer manufacturing.

Getting There

ANAHEIM, Calif. — Although southern California is the land of the automobile, there are other ways to make the one-hour trip from Los Angeles International Airport (LAX) to Anaheim.

Airport Service operates buses every 45 minutes from LAX to the Disneyland Motel for \$5.20 per person. There you can hail a cab to your motel.

Airport Service buses cruise the airport just outside the baggage claim area of every airline. If you want to hail one, simply wait at the traffic island, the spokesman said.

Service a bit more expensive (but also more convenient) is provided by Orange County Limousine Service — but you need a reservation at least 24 hours in advance. This service, which is "door to door," will pick up from one to three people at LAX and drop them at their Anaheim motel for a total tab of \$21, a spokesman said. That telephone number is (714)-558-1411.

Still more luxurious is Regency Limousine. Regency will call for you at LAX at a prearranged time and deliver you to the Anaheim motel of your choice for approximately \$97.

As many as six can be graciously accommodated in a stretched Lincoln Continental. However, if you choose this method, you had better reserve today, because they like a week's notice. Regency's number is (714)-772-7171.

Of course, you can always rent a car, and you can even fly to Orange County airport. Flying, however, will not save you any time.

Local Eating: A Smorgasbord of Delights

By Al LeAunce

Special to CW

When Computerworld asked me to identify my favorite Orange County restaurants to help guide NCC visitors toward some pleasant dining experiences, my first inclination was to decline on grounds that the crowds might become too great for me to enjoy the places my friends and I like to frequent. But then I realized that most of you would only be here for a week, so why not share the wealth on a temporary basis?

By and large, the places I have identified are where the locals go, although some in the proximity of Disneyland have a tendency toward overcrowding and lengthy waits, albeit generally worth the wait.

For simplicity's sake, the following eateries are classified by cuisine, with appropriate comments. As for dress, casual is the word for the Newport area and all but the poshest of the rest, which I have chosen to omit.

★ SEAFOOD ★

This category comes first because it answers the first question most Eastern visitors ask. Tops on my list is Delaney's Sea Shanty, of which there

Want to try out some of Al LeAunce's Suggestions? Their addresses and telephone numbers are on NCC Preview/5.

are four, all uniformly good. At least an hour's wait, but the cioppino (sea food stew) is worth it if you like spice, and the rest of the menu is uniformly excellent. Great clam chowder. Located next to Lido Isle, Newport El Toro, Anaheim (Ball Road); and the Orange County Airport. Maxwell's at the Huntington Beach Pier and Anthony's Pier II, at Newport Dunes in Newport, are almost identical in menus and

about equal in quality, although both are now independently owned. Most dishes have an Italian flavor, such as the Mulberry St. Seafood Feast — something of cioppino on a bed of linguini, although the live lobster is a classic anywhere. Surprisingly excellent prime rib (forget the veal parmigiana) and a respectable wine list. Art-deco atmosphere, an ocean view and disco dancing after 9 p.m.

Incidentally, most of the better general restaurants also have first-class seafood selections, particularly those which may be identified, orally or by signboards, as specials of the day — look for fresh red snapper or the kind of swordfish steaks you'll find at the Quiet Woman on Coast Highway in Corona del Mar: small, intimate and good but loud music.

For the most casual of all dining and charcoal-broiled seafood pulled from the Pacific the day you eat it, try the Crab Cooker on the Balboa Peninsula.

(Continued on Preview/5)

Game Time, Sports Fans

ANAHEIM, Calif. — The California Angels will not be around early next week, baseball fans, but if you are planning to stay for the weekend, the Angels will meet the Kansas City Royals Friday, Saturday and Sunday, May 23, 24 and 25.

Game times are 7:30 p.m., 7:00 p.m. and 1:00 p.m., respectively. Tickets cost \$2, \$3, \$4 and \$5, and the Angels' ticket office is at 2000 State College Blvd., at the intersection of Katella Ave. It's little more than a home run away from the Anaheim Convention Center!

Additional information can be obtained by phoning (714) 634-2000.

Because of Decade Ahead NCC Speakers to Accent Business

By Jeffrey Beeler

CW West Coast Bureau

ANAHEIM, Calif. — Representatives of the business community have cornered the featured-speakers market at this year's National Computer Conference.

Traditionally, NCC's have drawn a fair share of their keynote and plenary session speakers from the ranks of government and academia. But NCC 1980 promises to be different.

This year, the conference's featured-speaker slots have gone to occupants of the U.S. corporate boardrooms. From the keynote to the last plenary session speaker, academic and government faces are nowhere to be seen.

The decision to fill this year's featured-speakers lineup with business leaders reflects the conference organizers' conviction that the 1980s are likely to prove the computer industry's most pivotal decade to date. Tough business challenges lie ahead for the computer industry during the next 10 years, and its success in dealing with those challenges will depend perhaps more than ever before on the soundness of its management decisions.

Thus, in selecting featured speakers for the first NCC of the 1980s, conference organizers felt addresses with a strong business accent would prove particularly appropriate as well as appealing to a large share of this year's



show attendees.

So said Xerox Electro-Optical Systems, Inc. President Guy Dobbs, and he ought to know. As NCC 1980's vice-chairman, Dobbs played a major role in selecting the speakers for this year's keynote and plenary session addresses. In fact, selecting the speakers and convincing them to participate in the NCC program was Dobbs' main responsibility as a conference official.

One of the most serious problems in arranging the speakers slate, Dobbs said, lies in finding individuals who combine an extensive knowledge of the computer industry with an ability to communicate effectively.

Many well-known industry figures may have worthwhile messages to convey to an NCC audience, but are nevertheless rejected as featured speakers because they lack the communications skill to make their presentations clear and entertaining, Dobbs explained.

'The Thrill Of Your Life'

ANAHEIM, Calif. — After a day of checking out data speeds, check out your own speed at the Malibu Grand Prix here.

The Malibu Grand Prix is a mini-car racetrack. Once belted in and helmeted, you proceed to the starting gate driving a colorful scaled-down Formula 1 racer. A green light flashes, and you are off around a half-mile course full of hairpin and "S" curves.

As you speed down the home stretch, your driving time is flashed onto an electronic scoreboard.

These little cars do about 35 to 40 miles per hour, but it feels like about 120 mph.

The track is scheduled to be open Sundays through Thursdays from 11:00 a.m. to 11 p.m. On Fridays and Saturdays, the closing time is 12:00 p.m.

A valid driving license is required, and you must buy a Malibu racing license for \$2. Depending on the number of laps you drive, you will be charged between \$1.50 to \$1.65 per lap.

CW staffers say it is "the thrill of your life." Hurry to the Malibu Grand Prix at 57th Freeway and Katella Ave. (behind the Anaheim Stadium).

More information is available by phoning (714) 634-0303.

SEE US AT THE NCC,
BOOTH 2553.

DELIVERING
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TELEX INTRODUCES LESS IN A TAPE DRIVE.

35% less energy, 30% less heat
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Our new Series 80 is a 3420 plug-compatible magnetic tape subsystem that can do everything its counterparts can do. It just does it for a lot less.

For example, it can read and write data in either 6250 BPI (GCR), 1600 BPI (PE), or 800 BPI (NRZI) densities with speeds up to 125 IPS. Truly the latest densities and speeds in tape drive technology.

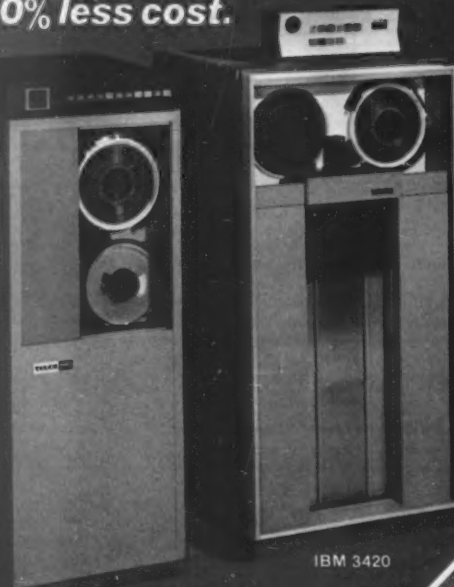
But the Series 80 also has something the 3420 and its alternatives don't — Telex's patented design features which reduce expensive floor space and operating costs.

Telex's Supr-Lite™ Capstan weighs only one-tenth as much as comparable drive capstans. This means the Series 80 can use a much smaller, more efficient drive motor. In addition, Telex's patented Tape Path eliminates large, unsupported spans of tape by utilizing primary and secondary vacuum buffers. This allows for unusually gentle tape handling at high program rates without tape resonance and oscillations.

These features and more let Telex give you a tape subsystem that exceeds industry technology performance. We just do it for a lot less. Less energy. Less heat. Less space. And less cost.

For more about the new, compact, plug-compatible Telex Series 80, call your Telex representative. Or phone our Marketing Department in Tulsa at 918-627-1111.

Our alternative to your spiraling operating costs.



Telex Series 80

IBM 3420

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Terminals/Peripherals/Data Entry and Word Processing Systems/OEM Products
6422 East 41st, Tulsa, Oklahoma 74135/(918) 627-1111
332 Consumers Road, Willowdale, Ontario M2J1P8/(416) 494-4444

Disneyland Only the Beginning...

ANAHEIM, Calif. — If you need a break from the show, plan to stay for the weekend or need to plan a side trip for the youngster you brought along, entertainment abounds in and around this city.

First on the list, of course, is the world-famous **Disneyland**, the original Disney entertainment park right in Anaheim.

Spend the whole day — or two — seeing Fantasyland, Adventureland, Tomorrowland, Frontierland, Bear Country, Main Street and New Orleans Square. Adults seem to enjoy the park almost more than the kids do, CW staffers have found.

Prices for adults are \$8.50 for an 11-ride ticket or \$9.25 for a 15-ride ticket. Children aged three to 11 get an 11-ride ticket for \$6.75 or a 15-ride ticket for \$7.50.

Lions and Whales

Lion Country Safari, only 20 minutes away, is a place you might enjoy for about four hours. You stay in your car while the animals roam free — or almost free. Admission costs \$4.95 for adults and \$3.25 for children aged three to 11. Special rates are offered for large groups.

Hanna-Barbera's **Marineland** — about an hour's drive away — is on the Palos Verdes Peninsula. Marine-

land advertises that it has "friends from the sea plus from TV."

It claims to have the world's largest team of performing killer

• **"The Sound of Music,"** May 19-23, Grand Hotel Dinner Playhouse. Ticket information: (714) 777-7710.

• **"Butterflies Are Free,"** May 16-25, Harlequin Dinner Playhouse, Santa Ana. Ticket information: (714) 979-5511.

complete with man-made lakes and waterfalls, European villages, the Far East and the Old West.

Tours of the 420 acres are avail-

• **Debbie Reynolds in a musical comedy,** May 23-26, Knott's Berry Farm Theatre. Ticket information: (714) 827-1776.

• **The California Surs, the local pro soccer team,** will meet the Houston Hurricanes May 21 at the Anaheim Stadium.

Special Events

whales plus acrobatic dolphins, sea lions, pilot whales plus "all new shows."

Admission costs \$6.75 for adults and \$4.75 for children three to 11.

Show Biz

You can learn what goes on behind the scenes at **NBC Television** in Burbank — also an hour's drive. NBC-TV offers a one-hour conducted tour at no charge.

That tour might be combined with a tour of **Universal Studios** in Hollywood. Billed as the "world's largest motion picture studio," it is

able with a guide in a motorized "Glamortram," and special effects include the parting of the Red Sea, Runaway Train, Collapsing Bridge, Jaws and many others.

Admission costs \$7.50 for adults and \$5.50 for children three to 11.

Cruise Ships

In nearby Long Beach, the former **R.M.S. Queen Mary** is berthed as a permanent museum, and the great salons, first-class cabins and suites, reconstructed wartime troop cabins and engine rooms are on view. The highlight of the tour is said to be

Cousteau's Living Sea, an exhibit created by the noted French oceanographer and television personality Jacques Cousteau. This exhibit includes a film.

Admission prices are \$5.75 for adults and \$3.50 for children five to 11.

Cruises can be booked to **Catalina Island** on a 700-passenger cruise ship. The ship departs from the Long Beach/Catalina Cruises Terminal in Long Beach at 9:45 a.m. and 2:15 p.m., Monday through Friday. Service is more frequent from Friday to Sunday.

Upon arrival at Avalon Bay, you can take a glass-bottomed boat trip, a coastal boat cruise, a bus tour of the island, or, if you like, spend the day at the beach or shopping. One-way tickets cost \$6.15 for adults and \$3.15 for children five to 12.

Of course, walks down Rodeo Drive in Los Angeles — the "in" place for posh shoppers — and roller skating in Venice are also popular!

All these places can be reached by automobile, but if you prefer, American Sightseeing International will take you on guided tours by bus. Prices and departure times are available by telephoning (714) 776-9210.

A Smorgasbord of Delights

(Continued from Preview/3)

Red storefront, paper plates and plastic utensils, but everything from great crab legs and chowder to broiled salmon — all delightful and moderately priced.

★ CHINESE ★

Only one Chinese restaurant, mainly because people who have eaten Chinese food around the world tell me this is the best there is, anywhere, and I agree. The name is the **Golden Dragon**, on Harbor Blvd. near Bay St., Costa Mesa. It's got a red front and looks like an auto upholstery shop, but don't believe it. And don't miss the Moo Shoo Pork, Kung Pao Shrimp and hot-and-sour soup. Ask for the Shanghai beef (it's not on the menu); it'll bring tears to your eyes. Frequent waits, but enjoy a cocktail on the sidewalk with the rest of the natives.

★ STEAKS, RIBS, ETC. ★

This is probably the most difficult of categories from which to cull recommendations, since I'm really not crazy about anybody's steaks but my own. But there are a few surprises, such as the **Crazy Horse Saloon** of Freeway 55 at Dyer Road, Santa Ana, where blue jeans and hearty appetites are SOP. Good spareribs, excellent Porterhouse steaks and a passable chili for all you dedicated country- and-western fans.

For prime rib, you could try **Gulliver's** on MacArthur, across from Orange County Airport, but you'll never get in; instead, try the **Five Crowns** on Coast Highway in Corona del Mar. Savory aged beef cut any way you like it, and a sociable experience. Not too ex-

pensive, considering the atmosphere and overall quality. **Mr. Stox** on Katella, just East of the Convention Center, also has given me some pleasant surprises in the beef department, at moderate prices.

If you don't mind dedicated mediocrity combined with pleasant atmosphere, there's always what we call "Coast Highway Cuisine," which applies to 80% of the bayside restaurants fronting the Coast Highway south of the Newport Boulevard bridge. Virtually identical menus, although the steaks and shellfish at the **Ancient Mariner** are better than most, and by all means try **Tony Roma's** barbecued ribs, just across the street.

★ ITALIAN AND MEXICAN ★

My absolute favorite is **Villanova**, on Newport's Coast Highway just south of the Newport Blvd. bridge. Not much action from tourists because the place looks like it's falling down. But don't believe it. Splendid veal — thin, white and tender — and the kind of linguini with clam sauce you have fantasies about. House specialties like the **Mozzarella appetizer** and the proprietary capuccino are equally unforgettable. And don't drive fast or you'll miss the place.

Others well worthy of your attention are **Alfredo's** at the South Coast Plaza Hotel on Bristol in Costa Mesa, with uniformly good food, wine and service; **Antonello's** across the way, on Sunflower, in South Coast Village; and **Ristorante Ervino** in Santa Ana (I haven't been there, but reliable sources tell me it's one of the best).

True Mexican aficionados might by-

(Continued on Preview/10)

LeAnce's Choice

DELANEY'S SEA SHANTY

1050 W. Ball Road
Anaheim
991-3300

630 Lido Park Drive
Newport Beach
675-0100

23696 El Toro Road
El Toro
581-3511

John Wayne Orange County
Airport
Santa Ana
546-9731

MAXWELL'S
317 Pacific Coast Highway
Huntington Beach
536-2555

ANTHONY'S PIER II
103 N. Bayside Drive
Newport Beach
640-5123

QUIET WOMAN
3224 E. Coast Highway
Corona del Mar
640-7440

THE CRAB COOKER
2200 Newport Blvd.
Newport Beach
673-0100

GOLDEN DRAGON
2023 Harbor Blvd.
Costa Mesa
642-7162

CRAZY HORSE SALOON
Freeway 55 at Dyer Road
Santa Ana
549-1512

GULLIVER'S
18482 MacArthur Blvd.
Irvine
833-8411

FIVE CROWNS
3801 E. Coast Highway
Corona del Mar
760-0331

MR. STOX

1105 E. Katella Ave.
Anaheim
634-2994

ANCIENT MARINER
2607 W. Coast Highway
Newport Beach
646-0201

TONY ROMA'S
2530 W. Coast Highway
Newport Beach
642-9070

VILLANOVA
3131 W. Coast Highway
Newport Beach
642-7880

ALFREDO'S
666 Anton Blvd.
(South Coast Plaza Hotel)
Costa Mesa
540-1550

ANTONELLO'S
3800 S. Plaza Drive
Santa Ana
751-7153

RISTORANTE ERVINO
243k N. Tustin Ave.
Santa Ana
547-2575

EL TORITO
4221 Dolphin-Striker Way
Newport Beach
833-9740

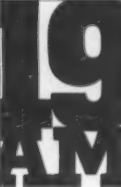



MAMA GARCIA'S EL
NOPAL
1201 W. Lincoln
Anaheim
991-1943

LE BIARRITZ
414 N. Newport Blvd.
Newport Beach
645-6700

RIVIERA
3333 Bristol
Costa Mesa
540-3840

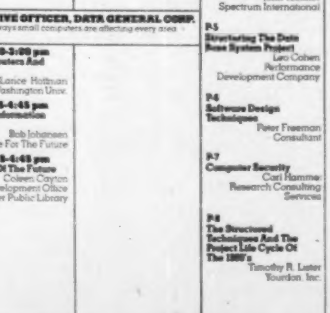
(Continued on Preview/10)

National Computer Conference . . .

	KEYNOTE ADDRESS Covers design of equipment and supporting technologies, and distribution through networking. Includes decisions relating to supercomputers, survivability systems and data base installation.	COMPUTER ARCHITECTURE Explores the use of computers in entertainment, microcomputers and their impact, management of the computing tool and staff, and the role of business and academic education and training.	APPLICATIONS OF COMPUTER TECHNOLOGIES State-of-the-art, user-oriented sessions on the storage, retrieval, and transfer of data. From hardware considerations to network language access to a data base.	DATA BASE MANAGEMENT & COMMUNICATIONS Every computer-related aspect of this explosive growth area, including electronic mail. How computers are used, managed, and integrated in an overall automated office.	OFFICE AUTOMATION Where we've been, where we are, and where we're going with computer modeling. Its value to small and large businesses and its role in decision support. Includes special sessions on color energy simulation modeling.	SIMULATION TECHNOLOGIES Sessions on programming standards, software quality assurance, languages, and requirements engineering. Emphasis upon the needs and responsibilities of the user.	SOFTWARE ENGINEERING TECHNOLOGIES A broad spectrum of critical subjects: data security, legal issues, transborder data flow, societal impact, venture capital and its effect upon technology.	SOCIAL DYNAMICS AND SPECIAL TOPICS How image processing is used and will be used in industry and medicine. Trends in facsimile data coding, compression, and standards. How doctors use image analysis display.	
	This year's keynote address will be delivered at 9:30 a.m. by David Packard, Chairman of the Board, Hewlett-Packard Company.								
	SPECIAL LUNCHEON SPEAKER: JOHN P. INLEY, CHIEF EXECUTIVE OFFICER, MANAGEMENT SCIENCE AMERICA (MSA)								
	"INFORMATION TECHNOLOGY: THE INDUSTRY OF THE EIGHTIES"								
	9-9 1:30-3:00 pm Data Base Translation or Distributed Data Base Architecture Steve Kitzler, Institute for Computer Science & Technology, U.S. Dept. of Commerce	9-5 1:30-3:00 pm Change Management (Women In Data Processing) Lori Pichell, Burroughs Corp.	9-7 1:30-4:00 pm Data Base Design Practices I & II Jeffrey Haller, Case Western University Dennis Rund, Pacific Telephone	9-9 1:30-3:00 pm Developing Technology in Office Automation Systems Carolyn Waters, Office Of The Future, Inc.	9-9 1:30-3:00 pm Solar Energy Computer Simulation Modeling Leigh S. Baumberg, Jet Propulsion Laboratories	9-4 1:30-3:00 pm ADA-Where It Stands Now Hal TRW	9-2 1:30-3:00 pm Privacy Protection in Transborder Data Flow Ben Tarr, Department of Computer Science, Cal. State University	9-1 1:30-3:00 pm Medical Imaging Warner Free, USC Medical Imaging Group	9-30 3:15-4:45 pm Medical Education Noel Egan, M.D. Soc. For Computer Medicine
	9-12 3:15-4:45 pm Survival Systems Richard Mervin, George Washington Univ.		9-14 3:15-4:45 pm Architecture Of The Next Generation Of Data Base Management Systems Dennis McLeod, USC	9-10 3:15-4:45 pm Management Of Information Technologies In The 80's Frank Khoo, International Data Corp.	9-10 3:15-4:45 pm Advertis in Process Control Edgar Brand, The Fabron Company	9-4 3:30-4:45 pm Xerox Development Corp. Kennerly W. Bond	9-4 3:30-4:45 pm Venture Capital Roger Altam, Computer Sciences Corp.	9-11 3:15-4:45 pm Early Experiences in Complying With Foreign Restrictions in Foreign Primary Laws The Social Dynamics Of Computing Use In Organizations Rob King, Dept. Of Information & Computer Science, University of California	
DON'T MISS THE CONFERENCE RECEPTION, 6-8 PM TONIGHT. GRAND BALLROOM DISNEYLAND HOTEL.									



9 AM	COMPUTER ARCHITECTURE Covers design of equipment and supporting technologies, and distribution through networking. Includes decisions relating to supercomputers, survivability systems and data base installation.	APPLICATIONS OF COMPUTER TECHNOLOGIES Explores the use of computers in entertainment, microcomputers and their impact, management of the computing tool and staff, and the role of business and academic education and training.	DATA BASE MANAGEMENT & COMMUNICATIONS State-of-the-art, user-oriented sessions on the storage, retrieval, and transfer of data. From hardware considerations to network language access to a data base.	OFFICE AUTOMATION Every computer-related aspect of this explosive growth area, including electronic mail. How computers are used, managed, and integrated in an overall automated office.	SIMULATION TECHNOLOGIES Where we've been, where we are, and where we're going with computer modeling. Its value to small and large businesses and its role in decision support. Includes special sessions on color energy simulation modeling.	SOFTWARE ENGINEERING TECHNOLOGIES Sessions on programming standards, software quality assurance, languages, and requirements engineering. Emphasis upon the needs and responsibilities of the user.	SOCIAL DYNAMICS AND SPECIAL TOPICS A broad spectrum of critical subjects: data security, legal issues, transborder data flow, societal impact, venture capital and its effect upon technology.	IMAGE PROCESSING AND COMPUTERS IN MEDICINE How image processing is used and will be used in industry and medicine. Trends in facsimile data coding, compression, and standards. How doctors use image analysis display.	PROFESSIONAL AND COMPUTER SEMINARS Full and half-day seminars for the professional who wants to come away with solutions and ideas he can implement now. Half-day sessions tie in with regular program sessions.
9-10 9:00-9:30 am Network Architecture In W. Corbett Room, Allen & Hamilton, Inc.	9-10 9:00-9:30 am Computers In Entertainment And Sporting Events David Snyder West Dancer Productions	9-10 9:00-9:30 am Concurrent Consistency And Reliability In Distributed Data Base Management Sharon Stroupova University Of Pittsburgh	9-10 9:00-9:30 am Office Automation And The Executive Secret James Corliss Office Of The Future, Inc.	9-10 9:00-9:30 am Numerical Methods For The W's Roger Fineman Sperry Univac	9-10 9:00-9:30 am Rumps-The Devil And Goliath Story In Software Engineering Henry Hebranson MJC	9-10 9:45-11:15 am User Requirements And Software Specifications David L. Heizman Annenberg School Of Communications USC	9-10 9:45-11:15 am Image Processing In Medicine How image processing is used and will be used in industry and medicine. Trends in facsimile data coding, compression, and standards. How doctors use image analysis display.	9-10 9:45-11:15 am A Fragmentary View Of Distributed Processing Systems Kenneth J. Thibault	
9-10 9:45-11:15 am Computers And The Performing Arts William Ward Theater Arts Department UCLA	9-10 9:45-11:15 am Application Development Methods And Systems Berni Koryakos Mary E. S. Lomas College Of Business & Public Administration University Of Arizona	9-10 9:45-11:15 am Personal Computing: Societal Impacts And Future Directions Donald C. Ruse College Of Business & Administration University Of Colorado	9-10 9:45-11:15 am Business Vs. Demotivators In Improving Performance Of Computer Personnel Donald J. Couper College Of Business & Administration University Of Colorado	9-10 9:45-11:15 am Business Vs. Demotivators In Improving Performance Of Computer Personnel Donald J. Couper College Of Business & Administration University Of Colorado	9-10 9:45-11:15 am Facsimile In The Real World A. Windsor Brown General Automation	9-10 9:45-11:15 am Image Processing In Medicine How image processing is used and will be used in industry and medicine. Trends in facsimile data coding, compression, and standards. How doctors use image analysis display.	9-10 9:45-11:15 am Image Processing In Medicine How image processing is used and will be used in industry and medicine. Trends in facsimile data coding, compression, and standards. How doctors use image analysis display.	9-10 9:45-11:15 am Image Processing In Medicine How image processing is used and will be used in industry and medicine. Trends in facsimile data coding, compression, and standards. How doctors use image analysis display.	
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...1980 Schedule at a Glance



COMPUTER ARCHITECTURE	APPLICATIONS OF COMPUTER TECHNOLOGIES	DATA BASE MANAGEMENT & COMMUNICATIONS	OFFICE AUTOMATION	SIMULATION TECHNOLOGIES	SOFTWARE ENGINEERING TECHNOLOGIES	SOCIAL DYNAMICS AND SPECIAL TOPICS	IMAGE PROCESSING AND COMPUTERS IN MEDICINE	PROFESSIONAL DEVELOPMENT SEMINARS
Covers design of equipment and supporting technologies, and distribution through networking. Includes decisions relating to supervisory, survivability systems and data base installation.	Explores the use of computers in entertainment, microcomputers and their impact, management of the computing tool and staff, and the role of business and academic education and training.	State-of-the-art, user-oriented sessions on the storage, retrieval, and transfer of data. From hardware considerations to natural language access to a data base.	Every computer-related aspect of this explosive growth area, including electronic mail. New computers are used, managed, and integrated in an overall automated office.	Where we've been, where we are, and where we're going with computer modeling. Its value to small and large businesses and its role in decision support. Includes special sessions on solar energy simulation modeling.	Sessions on programming standards, software quality assurance, languages, and requirements engineering. Emphasis upon the needs and responsibilities of the user.	A broad spectrum of critical subjects: data security, legal issues, transducer data flow, societal impact, voice communications, venture capital and its effect upon technology.	New image processing is used and will be used in industry and medicine. Trends in facsimile data coding, compression, and standards. How devices use image analysis display.	Full and half-day seminars for the professional who wants to come away with solutions and ideas he can implement now. Half-day seminars tie in with regular program sessions.
9-48 9:00-9:30 am Issues Of Data Base Machine Design Brimley Su Computer & Information Sciences Dept. University Of Florida Ft. Gaines Lowenthal Inst.	9-47 9:00-9:30 am Computers In Music Entertainment Richard B. Byrne Annenberg School Of Communications UCLA	9-46 9:00-9:30 am Keys To Distributed Processing Bobb Holman Database Design Corp.	9-45 9:00-9:30 am Applications Of Office Automation Peter Chen Graduate School Of Management UCLA	9-44 9:45-11:15 am 288 Bits Credibility To MIS-28 Gerald R. Wagner Eaton, Inc.	9-43 9:00-9:30 am Software Reliability—Models And Requirements John Mues Bell Laboratories	9-42 9:00-9:30 am Image Understanding Larry D. Sisti CARPA/SPD	9-41 9:45-11:15 am Half Day (am)	
9-51 9:30-9:55 am Support Systems Digital Equipment Corp.	9-50 9:30-9:55 am Education In Information Systems Richard Spauld Eastern Illinois University	9-49 9:30-9:55 am Data Base Technology Man Shu IBM Research David Johnson Naval Shipyard Naval Ship R & D Center	9-48 9:45-11:15 am Modeling Of The Office Processes D. Tachman University Of Toronto	9-47 9:45-11:15 am Software Reliability Mervyn Lipow TIW	9-46 9:45-11:15 am Engineering—An Interdisciplinary View Pei-Pan University Of Alabama Huntsville	9-45 9:45-11:15 am Software Reliability Mervyn Lipow TIW	9-44 9:45-11:15 am Software Reliability Mervyn Lipow TIW	
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COMPUTER ARCHITECTURE	APPLICATIONS OF COMPUTER TECHNOLOGIES	DATA BASE MANAGEMENT & COMMUNICATIONS	OFFICE AUTOMATION	SIMULATION TECHNOLOGIES	SOFTWARE ENGINEERING TECHNOLOGIES	SOCIAL DYNAMICS AND SPECIAL TOPICS	IMAGE PROCESSING AND COMPUTERS IN MEDICINE	PROFESSIONAL DEVELOPMENT SEMINARS
Covers design of equipment and supporting technologies, and distribution through networking. Includes decisions relating to supervisory, survivability systems and data base installation.	Explores the use of computers in entertainment, microcomputers and their impact, management of the computing tool and staff, and the role of business and academic education and training.	State-of-the-art, user-oriented sessions on the storage, retrieval, and transfer of data. From hardware considerations to natural language access to a data base.	Every computer-related aspect of this explosive growth area, including electronic mail. New computers are used, managed, and integrated in an overall automated office.	Where we've been, where we are, and where we're going with computer modeling. Its value to small and large businesses and its role in decision support. Includes special sessions on solar energy simulation modeling.	Sessions on programming standards, software quality assurance, languages, and requirements engineering. Emphasis upon the needs and responsibilities of the user.	A broad spectrum of critical subjects: data security, legal issues, transducer data flow, societal impact, voice communications, venture capital and its effect upon technology.	New image processing is used and will be used in industry and medicine. Trends in facsimile data coding, compression, and standards. How devices use image analysis display.	Full and half-day seminars for the professional who wants to come away with solutions and ideas he can implement now. Half-day seminars tie in with regular program sessions.
9-54 9:45-11:15 am Data Base Processors Eugene Lowenthal Inst.	9-53 9:45-11:15 am Facilities, Training, And Applications T.C. Brown Computer Sciences Corp.	9-52 9:45-11:15 am Implementing A Data Management Plan And Query Requirements Linda Taylor Systems Development Corp.	9-51 9:45-11:15 am The Developing Information Infrastructure Russell Abbott Department Of Computer Science Cal. State University	9-50 9:45-11:15 am Software Reliability Mervyn Lipow TIW	9-49 9:45-11:15 am Software Reliability Mervyn Lipow TIW	9-48 9:45-11:15 am Software Reliability Mervyn Lipow TIW	9-47 9:45-11:15 am Software Reliability Mervyn Lipow TIW	9-46 9:45-11:15 am Software Reliability Mervyn Lipow TIW
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GTC. The right button to push for all your display

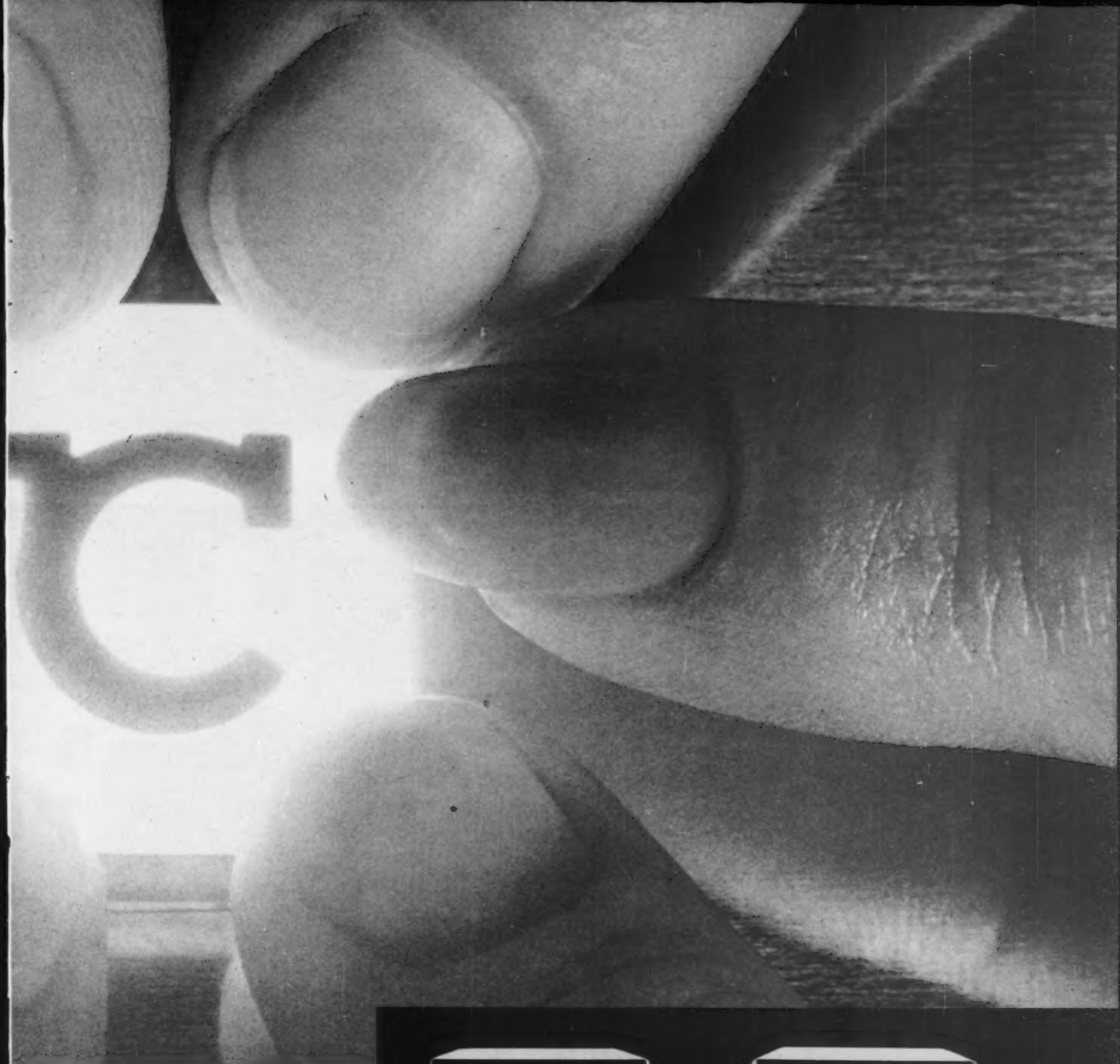
The key to GTC is versatility. We're the only terminal manufacturer with production and service facilities on both U.S. coasts. And GTC is one of the largest suppliers of data display terminals to Europe and the Orient. So we can deliver whatever you need, wherever you need it.

GTC offers models that are teletype-compatible as well as terminals that are interface-compatible with DEC, Burroughs and NCR computers. And GTC offers

models that emulate other major terminals, too.

Both our GT-100 and GT-400 Series also offer the versatility of user-programmable function keys, multiple keyboard configurations (including foreign character sets), full video attributes, plus editing and line drawing capability.

GTC is versatile in its thinking, too. We're willing to spend a little more, to experiment and innovate a little more, to bring



terminal needs.

you a lot more, for the money.

And if that's what you want
in a display terminal source, then
you've got your finger on the right
button.

For more information on GTC products and services, call toll-free today. In California: 800-432-7006. Anywhere else in the United States: 800-854-6781. Ask for Gloria Page. Or write Gloria Page at General Terminal Corporation, 14831 Franklin Avenue, Tustin, CA 92680. Telex: 910-595-2428. We have offices throughout the world. In Canada, contact Lanpar Ltd., 85 Torbay Road, Markham, Ontario L3R. Phone: 416-495-9123.

• Win a free GTC terminal. For details, stop by Booth 1107 at the NCC Show.



The right button to push.™
General Terminal Corporation

Other Dining Spots

BESSIE WALLS FINE FOODS & SPIRITS
1074 N. Tustin Ave

630-2812
\$3.00-\$11.00

BOB BURN'S RESTAURANT
500 N. Euclid
776-8749

\$3.00-\$13.95
CATTLEMAN'S WHARF
1160 W. Ball Road
535-1622
\$5.00-\$20.00

CHARLEY BROWN'S RESTAURANT
1751 S. St. College

634-2211
\$3.50-\$13.95

DANDEL'S RESTAURANT
1490 S. Anaheim Blvd.
776-6600

\$3.25-\$9.00

DIMITRI'S RESTAURANT
907 S. Beach Blvd.
828-1780

\$5.95-\$8.95

THE KETTLE RESTAURANT
1776 W. Lincoln
774-5557

\$2.45-\$13.95

Anaheim Area: Smorgasbord of Cuisines

(Continued from Preview/3)

pass **El Torito**, just off MacArthur, two blocks west of OC Airport (at the Golden Triangle, and you'll find out why they call it that when you get there). But I think it's hard to beat in terms of variety and high quality, for Mexican food you want to be able to digest. Besides, the Margueritas are incredible. Real stringy beef in the tacos, burritos and stuff, and everything's crisp when it's supposed to be.

For the real thing, however, complete with heartburn, try **Mama Garcia's El Nopal** on Lincoln in Anaheim (1201 W. Lincoln). This is about as authentic as you can get without the need for a standby stomach pump.

FRENCH AND CONTINENTAL

Just one block off Newport Blvd. across from Hoag Hospital, you will find my all-around favorite, partly because tourists can never find it, but mainly because it has the best quality provincial French food this side of the farm in — in Normandy, that is. It's **Le Biarritz**, where you'll find a variety of splendid dishes, such as crisp, tender duck that you don't have to fight for and onion soup gratinee that Suzanne Hubner swears is the greatest this side of — and including — the Riviera, at South Coast Plaza, Costa Mesa. Ditto the rack of lamb and, when they have it, their rabbit casserole, which usually travels under an unpronounceable name. Their French table wine is excellent, as is their wine list; moderately priced. The Riviera is more on the expensive side, but it is first-class dining in more traditional style, albeit in more modest surroundings than **Chez Cary**, in Orange, or **Ambrosia**, in Newport, and **Chanticleer**, in Irvine, all of which I decline to comment on.

LeAnce's Choice

(Continued from Preview/5)

CHEZ CARY
571 S. Main
Orange
542-3595

AMBROSIA
501 30th
Newport Beach
673-0200

CHANTECLAIR
18912 MacArthur Blvd.
Irvine
752-8001

THE CELLAR
305 N. Harbor Blvd.
Fullerton
525-5682

LAKESIDE
4110 MacArthur Blvd.
Newport Beach
752-7841

BOB BURNS
37 Fashion Island
Newport Beach
500 N. Euclid
Anaheim
772-2130

For the best all-around dining, I suggest you look to **The Cellar**, on North Harbor in nearby Fullerton — an epicurean delight — or **Lakeside** just off Von Karman and MacArthur in Irvine. At **Lakeside**, you'll find gourmet-quality cuisine from the broadest menu in Orange County, and a wine list to match. Expensive, but also the most comfortable surroundings, next to **Bob Burns** at Newport Center, also located on N. Euclid in Anaheim. I've saved this for last because when I want

to head for the kind of place where I can kick back in a totally relaxed and quiet atmosphere, while enjoying the absolute finest aged prime rib, lobster tail or catch of the day, (and even the steak a la porterhouse) this has got to be the place. Call an hour or two in advance, and you'll never wait more than five minutes for the most pleasant hour you may enjoy in Orange county.

LeAnce is president of LeAnce & Co., Inc. of Newport Beach, a public relations firm.



"Series 80 TOTAL and Environ/1 gives us the power and versatility to handle a complex data base involving wide-ranging manufacturing applications and service a 400-terminal network with up to 85,000 transactions daily."

George B. Ream
Division Manager
Systems & Information Services
Mack Truck, Inc.

Mack is one of the leading manufacturers of heavy-duty trucks in North America

Other Dining Spots

MAMMA COZZA'S RESTAURANT
500 N. Brookhurst
776-0500
\$1.95-\$12.95

MR. STOX RESTAURANT
1105 E. Katella Ave.
634-2994
\$3.75-\$12.00

SILVER FOX SUPPER CLUB
1168 S. St. College Blvd.
776-9310
\$3.00-\$12.00

International Foods

ACAPULCO RESTAURANT (Mexican)
1410 S. Harbor Blvd.

956-7380 - 956-7383
\$2.30-\$7.00
CASA LOS AMIGOS (Mexican)
2240 W. Lincoln
774-4700
\$1.50-\$6.95

CASA MARIA (Mexican)
1801 E. Katella Ave.
634-1888
\$2.95-\$7.75

CHAO'S CHINESE & AMERICAN RESTAURANT
1560 S. Harbor Blvd.
776-1880
\$.99-\$7.95

DON DIEGO'S (Mexican)
1723 W. Katella Ave.
635-9091
\$1.00-\$6.10

DON JOSE MEXICAN RESTAURANT
2681 W. La Palma

995-2661
\$2.75-\$9.95
LAS LOMAS RESTAURANT (Mexican)
5638 E. La Palma
779-1200
\$1.85-\$7.85

MAMMA COZZA'S RESTAURANT (Italian)
2170 W. Ball Road
635-0063
\$2.95-\$8.45

NANKING CHINESE RESTAURANT
5634 E. La Palma Ave.
779-1410
\$2.25-\$7.75

SAMPAN RESTAURANT (Chinese)
420 S. Brookhurst
533-1071
\$2.50-\$9.50

Cafeteria-Smorgasboard

BIT O'SWEDEN SMORGASBOARD

1425 Lincoln Ave. 772-7150
\$2.69-\$3.99

FOUR SEASON'S CAFETERIA
1363 S. Anaheim Blvd.
776-6140
\$3.00-Up

GRISWOLD'S RESTAURANT
5717 Santa Ana Canyon Road.
974-5400
\$2.85-\$3.65

HANSA HOUSE RESTAURANT
1840 S. Harbor Blvd.
750-2411
\$3.75-\$5.75

SERIES 80 TOTAL. THE DBMS YOU'LL BE IMPRESSED WITH AFTER YOU'VE BOUGHT IT.

Almost every data base management system is impressive on paper. But Series 80 TOTAL is every bit as impressive in the real world of data processing operations.

Because in addition to giving you what you expect from a DBMS as a data processing specialist, it also gives you what you need as a manager.

That's not just us saying so. It's what DBMS users told International Data Corporation (IDC)—the independent research group—in the most comprehensive study of this type ever.

SAVES MAN-HOURS AND TIME

For example, IDC reported Series 80 TOTAL saves man hours two ways. First, it only requires an average of one person spending half his time to support the system. That's one fourth the people required by another leading package which needed four people on average and sometimes as many as 12. Unlike another leading package, Series 80 TOTAL was reported up and running right on schedule, not behind it. And unlike two other major packages, Series 80 TOTAL users were completely satisfied with its fast response time in actual operation.

EASILY ADAPTS TO CHANGE

It stands to reason that the more useful a DBMS is to management, the more they'll use it. According to the IDC survey, users integrated Series 80 TOTAL into an average of 41% of all applications. That's more than any other DBMS and almost twice as much as the next leading system.

That's because with Series 80 TOTAL's powerful data structuring capabilities almost any data relationship can be rapidly and easily defined.

And, as your business needs change, Series 80 TOTAL's modular step-by-step development capabilities are flexible enough to be adapted to change, quickly and economically.

You can add new data, new functions, even new applications without having to scrap, update, maintain or rewrite a dozen existing programs for every new one.

KEEPS ALL ITS PROMISES

Many DBMS packages promise to do everything we have just told you Series 80 TOTAL does. But when IDC asked DBMS users how they'd change their present package, Series 80 TOTAL was the only one of the three leading systems to emerge with a clean bill of health.

None of this is the least bit surprising. Because many of the new features and facilities that have made Series 80 TOTAL so successful come from more than 3,000 users who have used Series 80 TOTAL in almost half their operations over the last decade.

The end result is a DBMS that easily accommodates distributed processing, data base machines, even migration to the new IBM 4300 (because it supports VSAM) and TIS, Cincom's revolutionary new Total Information System. So, if you don't want to take our word, take the word of the users IDC surveyed.

Fill in the coupon below, or call Dennis Yablonsky, our National Sales Manager at (513) 662-2300 and we will review all the pertinent details of the IDC study. You will learn how Series 80 TOTAL has been designed and engineered for the 80's.

Contact us now, because the best time to find out how well a DBMS will do after it's installed, is before you buy it.

Please bring me proof of why Series 80 TOTAL outperforms the competition.

Name _____ Title _____

Company _____

Address _____

City State _____ Zip _____

Mail to: U.S.A.: Department D.C.
Cincom Systems, Inc., 2300 Montana Ave.,
Cincinnati, Ohio 45211, (513) 662-2300
International: Cincom Systems International,
17-19 Rue Montoyer, 1040 Brussels, Belgium,
(02) 511-6548



Cincom Systems
Systems Software Division

Dinner Houses

BUCCANEER DINING ROOM
JOLLY ROGER INN
620 W. Katella Ave.
772-2722
\$2.75-\$12.00

CAPTAIN GREENHORN-QUALITY INN
616 Convention Way
750-3131
\$3.25-\$11.95

CHEF'S KITCHEN-DISNEYLAND HOTEL
1150 W. Cerritos
778-6600
\$3.75-\$6.75

CRAWDADDY RESTAURANT-GRAND HOTEL
1 Hotel Way
772-7777

DAISY'S MARKET-ANAHEIM HYATT
1700 S. Harbor Blvd.
772-5900
\$2.45-\$11.50

FALSTAFF DINING ROOM-ANAHEIM SHERATON
1015 W. Ball Road.
778-1700
\$5.95-\$14.95

EL VAQUERO-DISNEYLAND HOTEL
1150 W. Cerritos
778-6600
\$1.25-\$14.50

MAZIE'S PANTRY-DISNEYLAND HOTEL
1150 W. Cerritos
778-6600

OAK ROOM-DISNEYLAND HOTEL
1150 W. Cerritos
778-6600
\$4.00-\$11.00

OVERLAND STAGE & TERRITORIAL SALOON
INN AT THE PARK
1855 S. Harbor Blvd.
750-3888
\$3.65-\$11.00

PIRATES TABLE-HOLIDAY INN-ANAHEIM
1850 S. Harbor Blvd.
750-2801
\$5.95-\$11.95

SHIPYARD INN-DISNEYLAND HOTEL
1150 W. Cerritos
778-6600
\$4.00-\$11.00
CRESCENDO
1721 S. Manchester
956-1412
\$3.95-\$8.95

(Continued on Preview/12)

Other Dining Spots

(Continued from Preview/11)

Fast Food

CARL'S JR.
1200 N. Harbor Blvd.
2119 N. Harbor Blvd.
313 E. Katella Way
\$2.00

CHURCH'S FRIED CHICKEN
920 S. Brookhurst
\$1.10-\$8.39

DEL TACO #6
430 S. Euclid
\$1.35-\$1.40

DEL TACO #8
3060 W. Lincoln
\$.69-\$1.35

DUNKIN' DONUTS
528 S. Beach Blvd.
\$.30-\$1.99

MCDONALD'S HAMBURGERS
2411 W. Ball Rd.
\$.32-\$1.99

MITACO DRIVE IN
2801 E. Lincoln Ave.
\$.32-\$1.95

PIONEER TAKE OUT #127
1061 N. St. College Bl., #D
\$1.15-\$10.00

STRAW HAT PIZZA
500 S. Euclid
\$.89-\$8.00

TACO DE CARLOS
273 E. Katella Way
\$.32-\$1.29

Coffee Shops

ANAHEIM BOWL
1925 W. Lincoln Ave.
774-4710
\$1.00-\$3.95

BOB'S BIG BOY RESTAURANT
111 S. Euclid
535-9343
\$1.00-\$4.40

**CARL KARCHER'S
SUNSHINE BROILER**
1200 N. Harbor Blvd.
535-4848
1168 W. Katella-774-1680
\$2.00-\$8.00

COCO'S RESTAURANT
520 N. Anaheim Blvd.

775-4916
\$1.50-\$5.25

DENNY'S RESTAURANT
1420 N. St. College Blvd.
533-2482
\$1.10-\$7.25



**DISNEYLAND HOTEL
COFFEE SHOP**
1150 W. Cerritos
778-6600
\$2.00-\$8.50

FITZGERALD'S RESTAURANT
1810 E. Katella Ave.
634-9600
\$.35-\$5.75

GILMORE'S COFFEE SHOP
1909 E. Lincoln Ave.
535-9715
\$1.10-\$6.95

HAMBURGER HOUSE RESTAURANT
1770 S. Harbor Blvd.
535-0222
\$1.45-\$6.75

**INTERNATIONAL
HOUSE OF PANCAKES**
830 N. Euclid Ave.
535-9014
\$1.50-\$5.95

**JOLLY ROGER INN
COFFEE SHOP**
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772-2722
\$.40-\$5.65

KENO'S RESTAURANT
2661 W. La Palma
761-5366
\$1.35-\$7.95

**MRS. KNOTT'S CHICKEN
DINNER RESTAURANT**
8039 Beach Blvd.
827-1776
\$2.55-\$4.50

LINDEL'S RESTAURANT
1783 W. Lincoln Ave.
772-8210
\$1.35-\$5.70

**MARIE CALLENDAR'S
RESTAURANT & PIE SHOP**
408 S. Brookhurst
635-1370
\$2.95-\$6.95

MIMI'S CAFE
1240 N. Euclid Ave.
535-1552
\$1.50-\$5.25

PEASANT FARE RESTAURANT
1225 N. Euclid Ave.
776-3360
\$1.45-\$6.55

RIKIO'S RESTAURANT
2383 W. Lincoln
635-4544
\$1.95-\$11.50

SAMBO'S RESTAURANT
2110 S. Harbor Blvd.
750-2661
\$1.65-\$4.75

SAMBO'S RESTAURANT
1100 W. Katella Ave.
772-0414
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Software at NCC

Dataware, Inc.

ANAHEIM, Calif. — Four software translators will highlight Dataware, Inc.'s exhibit in Booth 2603.

A Fortran-to-Fortran multiple pass, syntax translator approaches the conversion task by automating repetitive changes, the vendor said.

Designed to run in an IBM 360 or 370 DOS or OS environment, this translator's components include a Fortran statement scanner, precompiled interpreter logic tables, interpretive analysis executive and Fortran statement formatter. Price varies according to the type of Fortran conversion being addressed.

Also set for display is Version 5.8 of the firm's RPG/RPG II-to-ANS Cobol translator that is said to produce a number of different Cobol syntaxes including DOS or OS ANS Cobol.

This package accepts most RPG versions such as System/3 RPG II, Mod 20 DPS RPG and 360 and 370 DOS RPG, the vendor claimed. Using 128K bytes of memory, the translator is available on IBM 360, 370 and compatible mainframes, Digital Equipment Corp.'s Decsystem-20, Honeywell, Inc.'s H6000, and Univac's 1100. Annual license fee is \$15,300.

Other Conversion Systems

Two other conversion systems — an SPS/1401/1410 Autocoder-to-ANS Cobol package and a Cobol-to-Cobol converter — will be shown.

The first system converts source Autocoder or SPS programs to ANS Cobol. Its features include the use of original Data and Procedural names to generate Cobol statements; optimal Cobol code based on the program logic techniques in the original source program; a side-by-side listing of the original source and the generated Cobol statements; conversion aid notations; and a cross-reference listing of data

and procedural names in the generated Cobol coding.

Written in ANS Cobol, this package can operate in a DOS or OS mode within a 128K-byte partition and license for \$15,300/year.

The Cobol-Cobol syntax conversion system is designed to aid in translating programs from one operating system to another.

This table-driven package generates a conversion worksheet and includes

self-explanatory diagnostic messages to help determine problems before implementing the converted program, the vendor claimed.

Vendors addressed by this translator include Burroughs Corp., Control Data Corp., Digital Equipment Corp., Honeywell, IBM, NCR Corp. and Univac.

The annual license fee is \$4,140 from Dataware, Inc. 2565 Elmwood Ave., Buffalo, N.Y. 14217.



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Computerworld Extra! is a new concept for Computerworld, a new service for our 535,000 readers*, and a new vehicle for your advertising.

Computerworld Extra! is an extra issue of Computerworld — our first ever — to be published this September 17th. It will appear in what our Editor, Drake Lundell, calls a "tabazine" format. This means glossy, full-color covers on the outside, and a magazine format inside — but tabloid-size throughout.

Computerworld Extra! will also be different in its focus. The entire issue will be devoted to one subject: "Software Systems in the '80s," and it will contain articles by some of the world's leading authorities on the subject, including Tom Muerer, Dixon Doll, Stephen Robinson, Dan McCracken and the experts at Auerbach Publishers and Datapro Research.

Topics to be covered will include The Bright Future of Applications Software Packages, The State of Utility Software, Data Communications Software Trends in the '80s and What's Ahead in Distributed Data Processing Software. Special emphasis will be given to one of the hottest areas of computer software — data base management systems.



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We'd be glad to give you more information on advertising in this new publication from Computerworld — as well as complete details on our subscribers and readers. Just contact your local CW Sales office, or call Roy Einreinhofer, Vice President, Marketing, CW Communications/Inc. at (800) 343-6474.

Wintek Corp.

ANAHEIM, Calif. — A C compiler for the 6800 microprocessor will be on display at Wintek Corp.'s Booth 1465.

Called a structured, general-purpose programming language, C can be used for operating systems, numerical text processing and data base programs, a Wintek spokesman said.

C is said to deal with the same objects — namely, characters, numbers and addresses — that microcomputers use. Thus, the language can manipulate these objects with the 6800 arithmetic and its logical operations, the spokesman claimed.

In addition, C can do address arithmetic, call any function recursively and declare a function's variables in a block-structured fashion.

The C compiler can run under the WIZRD multitasking disk operating system on the Sprint 68 microcomputer. C costs \$495; Sprint with 48K bytes of random-access memory, dual 8-in. floppy drives and WIZRD costs \$3,995 from Wintek Corp., 1801 South St., Lafayette, Ind. 47904.

Software at NCC

Intel Commercial Systems Division

ANAHEIM, Calif. — Intel Corp.'s Commercial Systems Division will show its family of Information Resource Management (IRM) products in Booths 1354 through 1360.

The most advanced component of the IRM family is the Fast-3805 Data Base Assist Processor (DBAP), the vendor said, adding the DBAP improves data base management system (DBMS) throughput capacity by up to 100% while reducing response time by 50%

or more.

DBAP represents an extension of System 2000/80 DBMS index processing into the high-speed data access facilities of the Fast-3805 semiconductor disk, Intel Commercial Systems added.

The firm's Multiple Systems Coupling (MSC) will also be unreleased and takes advantage of the distributed DP capabilities of IBM's 4300 series, the vendor said.

MSC supports fully coordinated

channel-to-channel communications between two or more IBM processors and allows System 2000/80 DBMS applications to execute on one or more processors and access data bases managed from another, the vendor said, adding all communications between multiple processors is fully transparent to the user.

The Integrated Data Dictionary (IDD), a control and documentation vehicle, will also be released. It con-

structs reports to describe data bases, CPUs and logical linkages within a distributed data base environment, the vendor claimed.

The IDD is integrated with System 2000/80 and provides prototyping capabilities for forecasting the impact of a change to an entity and supporting rapid response to changing environments, the vendor said.

System 2000/80 DBMS includes a relational query/update facility (Quest) designed for the end user in support of access to the data base as well as for the applications developer in support of data testing and prototyping.

The system also provides Programming Language Extensions (Plex) to Cobol, Fortran, PL/I and assembler and a report writer.

Taps/80, a programmer productivity tool, will also be offered. Other Intel Commercial Systems data communications products include the General Communications Interface for on-line transaction processing via CICS, Shadow II and TP 2000.

More information is available from Market Information Office, Intel Commercial Systems Division, 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

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International Mathematical & Statistical Libraries, Inc.

ANAHEIM — A library of Fortran mathematical subroutines for Digital Equipment Corp.'s VAX-11/780 and a program for solving partial differential equations will be introduced by International Mathematical & Statistical Libraries, Inc. (IMSL).

The library, which will be exhibited in Booth 1657, contains 458 mathematical and statistical subroutines. It is available on an annual subscription basis for \$1,200/year. That fee includes the source code on magnetic tape, a reference manual, maintenance, updates and telephone consultation on library usage.

A small, finite element program, Two-Dimensional Elliptic Parabolic and Eigenvalue Problems (Twodepep), is said to solve application-oriented, time-dependent, steady-state and eigenvalue problems in general, two-dimensional regions.

Twodepep can run on the following mainframes: IBM 360, 370, Series 30 and 4300 processors; Univac 1100 series; Burroughs Corp. B6700 and B7700; Control Data Corp. 6000, 7000 and Cyber 70/170 CPUs; and Honeywell, Inc. 600, 6000 and 66 processors. The program also operates on Digital Equipment Corp. Decsystem-10 and VAX computers.

Twodepep leases for \$1,500 annually from IMSL at 7500 Bellaire Blvd., Houston, Texas 77036.

Software at NCC

Prime Computer, Inc.

ANAHEIM, Calif. — At Booth 2353, Prime Computer, Inc. will be showing an enhanced version of Pascal designed for its interactive computer systems that is said to reduce program development time by 50% to 75%.

The firm's Pascal extension conforms to BSI/Ansi/ISO standards and offers global and local optimization and a source-level debugger that provides a variety of program development tools. The package not only permits the separate compilation of program procedures, but also allows the inclusion of source text libraries at compilation time and lets users link external procedures to the Pascal program.

The latter facility permits Pascal programs to access operating system functions and user routines written in Fortran 77, Fortran, Cobol and PL/I Sub-

set G, a spokesman stated.

The source-level debugger provides interactive capabilities typical of conversational languages without the need for interpretive execution, separate checkout and production compilers. Geared for novice programmers, the debugger requires no specialized knowledge of assembly language, load maps or the runtime environment, the spokesman added.

Using flow analysis techniques, the

firm's Pascal optimizes a single statement across entire program units, resulting in reduced program space requirements and increased program execution speeds. However, the global optimization facilities can be turned off to aid compilation during program development.

The Prime package runs on all 50-Series systems and has a bidirectional migration path, meaning that any programs developed on a Primos

operating system-supported machine will run on any other Primos computer.

Prime's Pascal costs \$4,000 for a one-time license fee and will be available in September.

The minicomputer manufacturer will also be exhibiting its Office Automation System and its low-end 250 system at the show, the spokesman said from 40 Walnut St., Wellesley Hills, Mass. 02181.



SAS Institute, Inc.

ANAHEIM, Calif. — SAS Institute, Inc. will exhibit two software products in Booth 4446: SAS, an information storage and retrieval package, and SAS/Graph, an interactive computer graphics system.

Using English-like statements, SAS can receive data in any form from any input device, the vendor claimed. Its data management features include creating, storing and retrieving data sets. Utility procedures for printing, sorting, ranking and plotting data are also part of the system.

Running on IBM 360, 370 and compatible processors under OS, OS/VS and VM/CMS, SAS can be used in batch and, interactively, in TSO. It licenses for \$4,500 the first year and \$1,500 for subsequent years.

Graphics Tool

SAS/Graph produces color plots, bar charts, graphs, slides and other displays on screens and plotters. All SAS retrieval, data management and analysis capabilities can be used with SAS/Graph, the vendor said.

The graphics system operates under VM/CMS and TSO. The first-year license fee for SAS users is \$2,500; after the first year, SAS/Graph licenses for \$1,000. SAS may be reached through P.O. Box 8000, Cary, N.C. 27511.

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According to Alec Grimison, applications such as a Monte Carlo simulation in statistical mechanics, when programmed in the array processor assembly language (APAL), have run on the FPS AP-190L from 2 to 3 times faster than on the IBM 370/168.

User Benefit

The result of this combined high performance and low cost of the FPS AP-190L Array Processor is a reduction in costs to system users at Cornell by as much as 95-99% — that's "20 to 100 times more processing for their computing dollar."

The array processor on the Cornell IBM 370/168 is available nationally and internationally via the Tynet and Telenet Telecommunications networks.

Support

The FPS AP-190L is supplied with an extensive library of scientific routines, complete program development capability in both array processor assembly language (APAL) and FORTRAN, an off-line simulator, and a complete hardware/software interface for the IBM 370.

For more information on FPS AP-190L Array Processors that interface to IBM 370, 303X Univac 1100, and DEC 10 systems, call the FPS field office nearest you, or contact Floating Point Systems directly.



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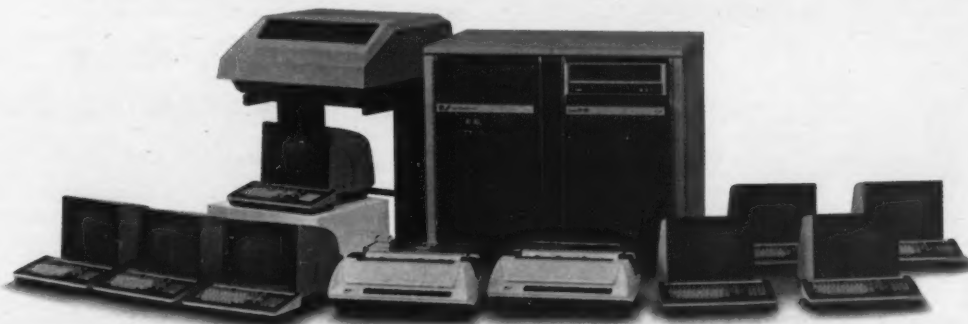
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Software at NCC

McCormack & Dodge Corp.

ANAHEIM, Calif. — McCormack & Dodge Corp. will introduce and feature a purchasing information management system and an on-line module for its accounts payable information system in Booth 4327 through 4329.

Known as PO+, the purchasing information management system is said to provide long- and short-term cash commitment reporting, general ledger and inventory interfaces, a vendor evaluation reporting module, user-

controlled printing of purchase orders and a report generator.

The package will also automatically match invoice, receipt and purchase order based on user-specified criteria and automatically handle requisitions, standard and blanket purchase orders, debit memos, partial shipments, back orders and systems contracts, according to the vendor.

The A/P Plus On-Line module reportedly speeds data entry and error

correction to guarantee efficient cash flow control when using McCormack & Dodge's accounts payable information system.

Features include a two-level search capability that looks at erroneous vouchers stored in the on-line work file and finds the voucher that needs correcting. The package also offers an option of complete error correction as entries are made, the vendor noted.

Among the enhancements now under

development for A/P Plus On-Line are inquiry to the A/P open master file, high-volume entry and edit and a repeating voucher framework, said to allow users to enter standing or recurring vouchers into the system and to plug in amounts as invoices are received.

Both software products run on IBM 360, 370 Series 30 and 4300 mainframes. A/P Plus On-Line cost \$5,000, and PO+ licenses for \$18,000. McCormack & Dodge is at 560 Hillside Ave., Needham Heights, Mass. 02194.

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Battelle Columbus Laboratories

ANAHEIM, Calif. — Basis, Battelle Columbus Laboratories' data management system, will be exhibited in Booths 2360 and 2362.

Currently available on several processors — IBM's 370 and Series 30, Univac's 1100 series, Control Data Corp.'s Cyber and 6000 series and Digital Equipment Corp's VAX-11/780 — Basis can handle multilingual applications, alphanumeric data and small or large data bases, the vendor said.

Through Olive, Basis' on-line entry and validation component, the data management system also allows users immediate access to the data base when parts need to be altered, Battelle claimed.

In addition, Basis provides Ansi standard thesaurus capabilities, procedure files to capture users' interactions and an on-line report writer, data entry processor and sorting capabilities.

Basis is said to perform searches either by using an inverted index or actual data records. With the system, users can perform proximity searching and search on numeric ranges. Price was not available from Battelle Columbus Laboratories, located at 505 King Ave., Columbus, Ohio 43201.

Tandem Computers, Inc.

ANAHEIM, Calif. — Tandem Computers, Inc. at Booth 4215 will be showing a yet-to-be-announced software enhancement to its relational data base and transaction processing software package for its Nonstop CPU under the Expand data communications network.

In addition, the firm will be demonstrating Expand, which features best path message routing, automatic packet forwarding, automatic rerouting without operator intervention during a line failure and communications support via private lines or X.25 packet-switched networks.

Tandem is located at Valley Green Drive, Santa Ana, Calif. 92707.

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Communications at NCC

Tektronix, Inc.

ANAHEIM, Calif. — A data communications analyzer that reportedly costs a third to a quarter as much as equivalent analyzers will head the list of introductions by Tektronix, Inc. at Booth 2327.

The Model 833 Data Comm Tester isolates malfunctions either by simulating data communications equipment to verify correct operations of the terminals or CPU or by performing standard bit error rate or block error rate

testing (Bert/Blert).

Tests are performed on the entire transmission link to verify correct operations of the modems or phone line. The Model 833 can be set to match the parameters of nearly any data communications system with data rates up to 9,600 bit/sec, including half or full duplex, synchronous or asynchronous, Tektronix said.

An RS-232C interface "assures nearly universal applicability, and an

adapter enables users to perform current-loop tests," the vendor added.

The user can store product-specific test messages that can be called up from a buffer using four keystrokes. The unit can be programmed to initiate the transmission of stored messages upon receipt of specified data sequences.

Trigger positioning permits selective analysis of data before, during and after the trigger sequence, according to

Tektronix. The Model 833 costs \$2,750.

An oscilloscope that can store signals digitally and be used for signal processing and data logging applications will also be introduced at NCC. It is called the Model 468.

The oscilloscope can store up to two 512-word waveforms or four 256-word waveforms. Tektronix said it is aimed at "medium storage applications in the medical, industrial/manufacturing and communications markets."

Internal routine service checking is standard. The Model 468 costs \$5,000, Tektronix said from Mailing Station 76-260, P.O. Box 500, Beaverton, Ore. 97077.

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Codex Corp.

ANAHEIM, Calif. — Codex Corp. will feature its Intelligent Matrix Switch and LC 3600 loop controller in Booth 2341.

The Intelligent Matrix Switch is a programmable, microprocessor-based device that allows data channel connections to be switched electronically in response to commands entered at a single operator console.

Additional features include front-end sparing, tandem switching and on-line monitoring.

The LC 3600 was designed to inter-



The LC 3600 Loop Controller

face with the IBM 3600 Financial Communications System. Significant line cost savings and added flexibility in network design can be had when the LC 3600 is used with various modems and statistical multiplexers or modems with built-in multiplexers, Codex claimed.

Codex is located at 20 Cabot Blvd., Mansfield, Mass. 02048.

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Terminals at NCC

Memorex Corp.

ANAHEIM, Calif. — Memorex Corp. will display its 2078 CRT station and 2076 remote cluster controller at Booth 2363.

Those terminal products, designed to operate with IBM 360, 370, 30 series and 4300 computers, offer a broad range of operating and performance features unavailable with equivalent communications devices, Memorex claimed.

The 2078 consists of a display monitor and separate keyboard. It was developed for entering alphanumeric data into or retrieving and displaying data from a CPU.

The unit is functionally equivalent to the IBM 3278 CRT terminal but provides enhanced features which contribute to improved operator convenience and greater communications system throughput, Memorex main-

tained.

The 2078 will be offered in four models, ranging in screen capacities from 960 to 3,440 char. The characters are displayed within a 7 by 14 dot matrix, with upper case letters in a 7 by 9 dot matrix on 15-in. diagonal screen.

To reduce screen burn and extend monitor life, the company has provided a feature which automatically dims the display if there has been no activity from the keyboard for 10 min.

The 2078 is available with three standard keyboard options: a 75-key data entry, 75-key Ebcidc typewriter and 87-key Ebcidc keyboard typewriter.

Memorex has included a "PA-3" key on its typewriter keyboards. That key allows conversion from a data entry to a typewriter keyboard with no soft-



ware changes when the 2078 is attached to the 2076 remote cluster controller.

Optional features for the 2078 include security keylock, audible alarm, extended keyboard cable, alternate coaxial connector and unprotected field indicator and selector light pen.

The 2076 Model 4 remote cluster controller is functionally equivalent to the controller and multiplexing functions of the IBM 3276 control unit/display station and supports up to eight Category A communications devices in Binary Synchronous Communications.

One 2076 controller, for example, will support all four models of the Memorex 2078 or the IBM 3278, the vendor said, noting the IBM 3276 control unit/display station cannot handle display stations of equivalent or lower model numbers.

The basic 2076 supports two Category A devices in BSC. By adding up to three optional device adapters, a total of eight CRT terminals and/or printers can be supported, Memorex said from San Tomas at Central Expressway, Santa Clara, Calif. 95052.



Memorex 2078-1

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We've enhanced our Series 300 SOFTPRINT™ Display again to give you all-in-one emulation of these IBM 3278 Models — 2, 4 and 5.

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So when the CRT is the focal point of your system, why settle for a large case and small screen? You can have excellent readability without taking up a lot of room. And get the features you need. Call us for more information at Ann Arbor Terminals, Inc., 6175 Jackson Road, Ann Arbor, Michigan 48103.

TEL: (313) 663-8000. TWX: 810-223-6033.

ANN ARBOR
TERMINALS, INC.

Conrac Corp.

ANAHEIM, Calif. — Conrac Corp. will demonstrate its Model 480 "Soft Terminal" along with a variety of CRT and raster scan monitors at Booth 1655.

The Model 480 can be user-designed to work as anything from a "glass Teletype" to a stand-alone small business system through the use of four to 16 plug-in boards, Conrac said. Up to eight user-defined boards can be plugged into the terminal's card cage, and as many as eight more and an accompanying power supply can be added by physically expanding the back of the terminal, a spokesman noted.

Less than 16K bytes of memory are needed for operating program storage and terminal functions such as refresh memory. The remaining memory of the up-to-64K bytes available can be used for data storage and user-defined applications, Conrac explained.

Software modules for the terminal can be resident in terminal read-only memory, downloaded from the host CPU into terminal random-access memories or bootstrapped from a floppy disk.

The CRT can display 25 lines of 80 char./line, reserving a 26th line for status indicators. The keyboard includes 93 typewriter style keys, a 59-key alphanumeric section and 34 function

keys.

The terminal will support half- or full-duplex asynchronous or synchronous communications at switch-selectable speeds from 50- to 9,600 bit/sec.

Conrac is located at 600 N. Rimsdale Ave., Covina, Calif. 91722.

Aydin Controls

ANAHEIM, Calif. — Aydin Controls will unwrap its Cluster Controlled Display System — four independent, complete workstations supported by a 5216 display computer equipped with a cluster controller — at Booths 2765 and 2864.

Each workstation has a high-resolution 13-in. color monitor, a keyboard with 45 user-programmed function keys and a joystick. The system features high-speed hardware vector generator and Siggraf-Core software.

Options include a complete line of peripherals and other customization or add-on features that can be applied to specific user applications, the firm said.

Other products Aydin will introduce at NCC include a color graphics hard-copy machine and a 5217 color graphics terminal. The firm is located at 414 Commerce Drive, Fort Washington, Pa. 19034.

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R. W. Bare, Assistant Corporate Controller, J I Case, A Tenneco Company, Racine, Wisconsin

The IBM Series/1 is a family of small, powerful, general-purpose computers for both distributed processing and standalone use. At over 50 company-owned stores nationwide of J I Case, a leading manufacturer of construction equipment and farm machinery, Series/1 systems are resulting in greater customer satisfaction through faster service on crucial parts orders.

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full information on the availability of a part in that store," says R. W. Bare, assistant corporate controller. "If the part is ordered, the Series/1 prints a picking ticket and produces an invoice to accompany the order.

"By speeding order handling and accounting procedures, the system has cut related workloads in half in some stores, helping to support a 10% to 20% growth in parts sales in the stores in which it is used. This productivity benefit alone justifies

the system for us. Most important, by transmitting consolidated data daily to Case headquarters, it gives management greater control over financial and production planning."

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To learn more about the Series/1, get in touch with your nearby IBM General Systems Division office. Or write IBM, P.O. Box 2068, Atlanta, GA 30301.

The remarkably flexible IBM Series/1 offers a range of modular features that allows you to build the data processing system you need at a low cost.



A small computer can make a big difference.

Terminals at NCC

Ann Arbor Terminals, Inc.

ANAHEIM, Calif. — The Graduate is the tentative name of a terminal that Ann Arbor Terminals, Inc. plans to introduce at Booth 1247. The terminal reportedly implements the major portion of the Ansi X3.64-1979 specification.

The Ansi specification details "a large set of commands, including editing, setting up guarded and protected areas and a side variety of transmission parameters," Ann Arbor said.

The Graduate is equipped with a CMOS battery random-access memory (RAM) that allows the user to define terminal functions through an initial setup mode, then store these func-



The Graduate

tions in the RAM.

The price of the Graduate is not yet available.

Ann Arbor will also show its graphics option for the Model 6080-Compat terminal. The option supports a set of line drawing commands and has a resolution of 160 dots horizontal by 120 dots vertical.

The command set includes Write/Erase Vector, Move Graphics Cursor, Set Raw Graphics mode and Set Sequential Vector mode in addition to alphanumeric command set. The option

costs \$2,095.

A rack-mountable terminal controller will be shown here as well. Standard features include three character accents, keyboard or diode-changeable transmission rates from 110- to 9,600 bit/sec and direct cursor address.

Called the R-Case, the controller uses RS-170-compatible video output, RS-232C or 7-bit parallel interfaces and an accessory 20mA current-loop cable. It costs \$795.

The vendor is located at 6175 Jackson Road, Ann Arbor, Mich. 48103.

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Datagraphix, Inc.

ANAHEIM, Calif. — Datagraphix, Inc. will introduce the 321-70 display system and demonstrate its latest information management systems at Booth 4201.

The 132-70 is an IBM 3278/3274-compatible product line that includes the 132-78 CRT, station, 132-80 printer and 132-74 cluster controller.

The microprocessor-based 132-78 is available in both stand-alone and cluster configurations that are reportedly compatible with the 3278 models 1 through 5 by switch selection. The standard 104-key keyboard permits all required functions including cursor select plus an 11-key numeric pad and line and character editing for unformatted operations.

The 132-78 also features the firm's Characteron CRT with up to 132 char./line in the OCR-B character font, the firm said. With the 132-70 system, the need for reformatting and reprogramming data required with standard 80-col CRTs is eliminated, it added.

The Model 9800 laser, high-speed nonimpact paper printer, designed to accept unformatted print data sets on magnetic tape from a range of computers, will also be demonstrated. The 9800 operates off-line at speeds up to 21,000 line/min.

Datagraphix will also exhibit the On-Line Autocom II microfiche recorder, which processes data into titled indexed microfiche at speeds up to 12,000 line/min; the Datamaster 250, a microprocessor-controlled high-speed microfiche duplicator; the Deskmate reader, which fits into a standard desk drawer; and the Datamate 750, a front-projection microfiche reader providing data security, as well as the Model 1500DL reader-printer featuring dual lens.

The firm can be reached at P.O. Box 82449, San Diego, Calif. 92138.

Digitronics

ANAHEIM, Calif. — Digitronics, a division of Comtec Information Systems, Inc., will show its Series 400 Alpha-Verter remote batch data entry terminals and a companion product, Porta-Verter, at Booths 2464 and 2564.

Alpha-Verter consists of five main modules: a 55-key alphanumeric keyboard with an embedded calculator-keypad, a hard-copy printer, magnetic tape cartridge, acoustic coupler and microprocessor control circuitry.

All transactions entered into the ter-

terminal are immediately printed on the hard-copy matrix printer. Information is also recorded on magnetic tape for later transmission, the vendor said.

Digitronics' Porta-Verter is a numeric-only nonprogrammable terminal.

All Digitronics terminals feature magnetic information recording, hard-copy transaction journals and built-in telecommunications capabilities, the vendor said from 53 John St., Cumberland, R.I. 02864.

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Terminals at NCC

Northern Telecom Systems Corp.

ANAHEIM, Calif. — Northern Telecom Systems Corp. (NTSC) will be exhibiting its line of remote information processing and telecommunications products in Booth 2309.

Included in the exhibit will be the Model 400 family of distributed processing systems, the Keybatch system and the Model 290 family of on-line CRT terminals, as well as the SL-1 digital stored-program telephone switching system.

The Model 445 supports up to eight data stations and uses Cobol, Basic and the Proprietary Terminal Applications Language (TAL 2000).

NTSC's resource-sharing features uses its own multi-tasking operating system to connect the Model 445 with peripherals and files located on the Model 405 entry-level systems.

The company will also display an SL-1 fully integrated digital business communications system. Two Model 445 systems will communicate through the SL-1 by means of add-on data modules that allow simultaneous voice and data communications over the same telephone line, NTSC

said.

NTSC is located at Data Park, P.O. Box 1222, Minneapolis, Minn. 55440.

Image Resource Corp.

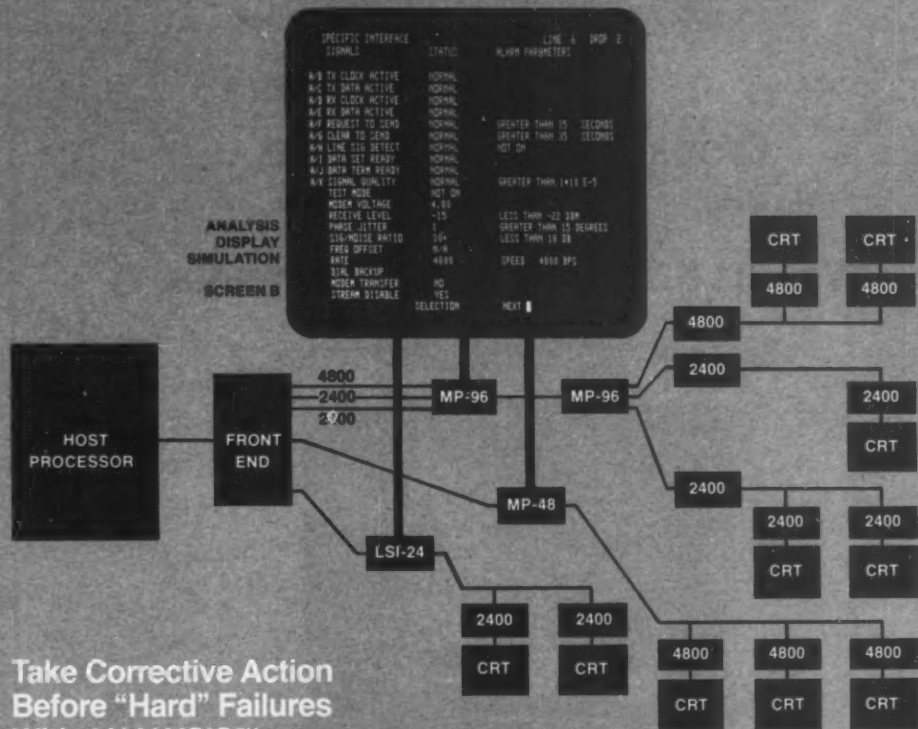
ANAHEIM, Calif. — Image Resource Corp. will show its Videoprint line at Polaroid Corp.'s Booths 2842 through 2846.

On display will be Image's full line, including the Videopoint 3000 series designed for educational, small business and home computing applications and the Videopoint 5000

series, a higher performance version designed for commercial use.

Videoprint systems take full-color photographs from a CRT terminal or television screen, the vendor said from 2260 Townsgate Road, Westlake Village, Calif. 91361.

DON'T WAIT UNTIL YOUR LINE IS DOWN...



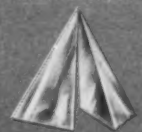
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Heuristics, Inc.

ANAHEIM, Calif. — A speech recognition system designed for use with a CRT terminal will be introduced here at Booth 1255 by Heuristics, Inc.

Designated the Vocon 5000, the voice-controlled system links with a Lear Siegler, Inc. ADM-3A terminal, a plug-in circuit board and a noise-canceling microphone. The unit recognizes 64 of the user's own spoken phrases or words and enables any program being run on the computer via the ADM-3A to be performed under voice control, according to the vendor. The standard recognition rate is 99% — or 100% if word/voice verification loops are used, the firm added.

The Lear Siegler terminal was chosen because of its \$895 cost and because of its large installed base, Heuristics said. Cost of the Vocon 5000 circuit board and microphone is \$2,000, Heuristics said from 1285 Hammerwood Ave., Sunnyvale, Calif. 94086.

Terminals at NCC



Intertec Data Systems Corp.

ANAHEIM, Calif. — A CRT terminal that emulates the control codes of four other CRT terminals will lead the list of product introductions by Intertec Data Systems Corp. at Booths 2240 through 2250.

The Emulator can be substituted for the Lear Siegler, Inc. ADM-3A, Digital Equipment Corp. VT-52, Hazeltine Corp. 1500 CRT series and Soroc Technology, Inc. IQ-120, Intertec said. The emulator includes an auxiliary

RS-232C printer port, a full numeric keypad, 12-in. nonglare screen and a terminal status line. It can communicate at speeds from 50-to 9,600 bit/sec and has a 24-line by 80-char. display.

Another product, the Superbrain QD, is an updated Superbrain desktop microcomputer, adding to the Z80-based, 32K-byte random-access memory (RAM) unit an additional 32K bytes of memory. The Superbrain's 320K bytes of storage capacity is

boosted on the QD to 715K bytes with the addition of twin double-density floppy disk drives. The Superbrain QD costs \$3,995.



Intertec Superbrain

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A 20M-byte Winchester drive, the Compustar 20, will also be shown for use with Superbrain, Superbrain QD or Superbrain Junior. The Compustar can accommodate up to 32 independent users with the addition of a low-cost multiplexer.

A basic Compustar system starts at approximately \$5,000; a multiplexer adapter costs \$1,500. Superbrain Juniors can be added for less than \$2,000 per user.

Intertec is located at 2300 Broad River Road, Columbia, S.C. 29210.

Computer Devices, Inc.

ANAHEIM, Calif. — A portable terminal having preprogrammed modules to prompt non-DPers will be introduced by Computer Devices, Inc. (CDI) at Booth 1447.

The Model 1206 Programmed Applications Terminal (PAT) is an enhanced version of the Model 1206 portable terminal. It is based on a 64K-byte microprocessor, half of which is available as random-access memory work space for applications written either in Basic or Motorola Semiconductor Products, Inc.'s assembly language.

An 80-col, 50 char./sec thermal printer is standard along with an integral minicassette, built-in modem and acoustic coupler.

The terminal's preprogrammed modules can be programmed to prompt interactively even users with no previous training, CDI said. Standard operator controls are keyboard mode selection, line length, code format, memory allocation, tape control, indexing, line rates, parity and print density.

Options include switch-selectable 80- and 132-col printing, an integral alphanumeric bar code reader and disk operation to support up to 1.44M bytes on a minidiskette.

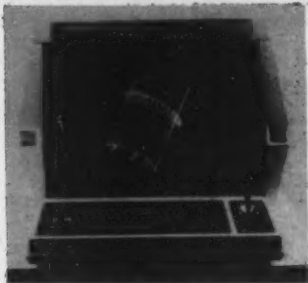
The user can communicate programs and information files to and from remote locations over phone lines, the vendor continued.

The 1206/PAT costs \$5,195 from CDI at 25 North Ave., Burlington, Mass. 01803.

Terminals at NCC

Megatek Corp.

ANAHEIM, Calif. — Megatek Corp.'s first color raster graphics terminal — the Model 7250 — will be unveiled at Booth 1115. It is claimed to offer higher speed than comparable units and give enhanced resolution on



Whizzard 7000

its 512 by 512 screen.

The Model 7250 uses a graphics processor for powerful animation and dynamic performance, Megatek said. The vector refresh graphics unit will be shown alongside the company's Whizzard 7000 CRT terminal and other graphics products.

Megatek is located at 3931 Sorrento Valley Blvd., San Diego, Calif. 92121.

Telex Computer Products, Inc.

ANAHEIM, Calif. — Telex Computer Products, Inc.'s Model 310 and Model 278E terminals will be on public display for the first time at Booths 2553 through 2563. The firm will also introduce a pair of tabletop printers, one of which is compatible with the IBM 3274/3276 as well as the Telex 276.

The Telex 287C tabletop printer is an advanced version of the firm's Model 287 console printer and is capable of printing bidirectionally at 200 char./sec. A touch-key pad on the operator panel allows the user to set up print parameters and select either 6 or 8 line/-in. spacing.

The Telex 311 hard-copy 9 by 7 dot matrix printer will be introduced for use with Telex's Model 310 Ascii-compatible CRT terminal. The microprocessor-controlled printer prints at up to 80 char./sec with an average speed of 40 char./sec. It is less than 5 in. high, Telex said, weighs about 14 lbs and prints the standard Ascii character set and 64 graphic symbols.

Besides the 310 and 278E terminals, Telex also plans to show its Model TC276 terminal controller. Designed to support the Telex 278 terminal, the unit is IBM 3276-compatible as well. Up to seven 278 terminals can be connected to a TC276 to form eight-station clusters.

Telex is located at 6422 E. 41 St., Tulsa, Okla. 74135.

Victor Business Products

ANAHEIM, Calif. — In Booths 1659 through 1663, Victor Business Products will show its 5010 series data terminals, its Series 100 matrix printers, and its Model 80 dot matrix printing mechanism.

The Series 100 line consists of three printing mechanisms. The Model 130 offers 5 by 7, 9 by 7 or user-specified fonts. The unit can use a black/red ink ribbon and has a print capacity of 34 columns. Options include driver electronics, power supply, logic board and

sprocket feed.

The Model 129 print head is the heart of all Victor matrix printers. The number of columns or font is user-defined. The unit can reportedly produce any desired character as well as graphics.

Victor's Model 150 multiposition printing mechanism can simultaneously print three documents — a sales slip, a customer receipt and a locked-in journal tape. The unit consists of two matrix printing heads mounted back to back. This model is available in four

modular combinations.

The Model 151 prints journal tapes and receipts, the Model 152 prints sales slips and the Model 153 prints sales slips and journal tapes.

The Victor 5010 is a series of data terminals designed for both end users and OEMs.

The Model 80 is an OEM printing mechanism for manufacturers of microprocessor-based systems, the vendor said from 3900 N. Rockwell St., Chicago, Ill. 60618.

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NIXDORF
COMPUTER

Terminals at NCC

Texas Instruments, Inc.

ANAHEIM, Calif. — Texas Instruments, Inc. will expand its Silent 700 line of data terminals with the introduction at Booth 1607 of its 120 char./sec 780 series of thermal printer terminals.

The models to be unveiled are the 781 receive-only printer, 783 keyboard send receive terminal, 785 portable data terminal and the 787 portable communications data terminal. All feature TI's bidirectional print head.

Standard features include full-duplex operation, a receive buffer and answer-back memory, capable of storing up to 21 char. in non volatile memory for terminal identification to the host CPU. All terminals offer the 128-char. Ascii set and self-diagnostics.

The 781 and 783 communicate at rates from 110-to 9,600 bit/sec and have a 1,000-char. receive buffer. Both have an EIA/dc-current-loop inter-

face.

The 781 allows the operator to control parity selection, interface assignments, communications speeds and soft diagnostics.

The 783 is a stationary terminal suited for immediate data/inquiry response in interactive data entry/communications business systems, according to TI.

The portable 785 and 787 weigh 17 lbs. While the 785 uses a 1,200 bit/sec

acoustic coupler, the 787 uses a direct-connect internal originate/answer modem with automatic speed selection.

Phone numbers can be dialed on the keyboard; one number can be stored for redialing, and the operator can command the terminal to disconnect phone communications with the host or network connection, TI claimed.

The 785 and 787 were designed for remote sales order entry, inventory control, real estate services and financial analysis. An RS-232C interface is optionally available to increase communications speed to 9,600 bit/sec, the 787 can be ordered with an acoustic modem for situations where a modular data jack or voice jack are not available.

The terminals cost \$1,595 for the 781, \$1,795 for the 783, \$2,445 for the 785 and \$2,895 for the 787. TI can be reached at P.O. Box 1444, M/S 7784, Houston, Texas 77001.



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BYTE
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Paradyne Corp.

ANAHEIM, Calif. — A microprocessor-based CRT terminal utilizing high-speed "loop" technology will highlight Paradyne Corp.'s exhibit in Booths 1756 through 1762.

The PDS270 functionally emulates an IBM 3270 CRT terminal when attached to Paradyne Response distributed processor systems or Pixnet control units. The systems will be shown along with Paradyne's Analysis network control system and its family of high-speed modem products.

Response is a distributed processor that executes IBM 370-type instructions and utilizes up to 2M bytes of nonvirtual memory. Designed to satisfy the requirement to process information at the remote site, Response uses Pixnet to provide interactive and bulk file transfers with any processor in the network.

Pixnet networking systems allow all network devices, including the PDS270, to appear to the host processor as locally attached. Consequently, polling is eliminated, host processor overhead is reduced and system response time is significantly improved, Paradyne claimed.

Paradyne is headquartered at 8550 Ulmerton Road, Largo, Fla. 33540.

"We switched to NCR," says Fred Brown of Rogers Enterprises.

BROWN:

Rogers Enterprises is an optical laboratory that fills almost 5000 eyeglass prescriptions a day. We have a complex computer program that guides us through the entire operation. From selection of the lenses out of inventory through the highly technical grinding process to billing of our customer. We have five years of development tied up in that program. And still we switched from another vendor to an NCR system.

NCR'S DUBOSE:

We could offer you the speed you had to have at a lower price than anyone else.

BROWN:

Yes. And NCR has a full line with no gaps. As our volume increases, we can expand our system in reasonable increments. Even better, we can move to a larger system without obsoleting our software. Now with NCR, I will not have to go through another conversion under the pressure of our daily workload.

NCR'S DUBOSE:

That's NCR's Migration Path Engineering. Your software always runs on the next larger system.

BROWN:

VRX (Virtual Resource Executive) really makes our NCR V-8550 go. Our lab program is very large and is used heavily in the morning, but only occasionally in the afternoon. Because we have virtual memory, this



Fred L. Brown (left) is comptroller/administrator of Rogers Enterprises, Inc., of Beaumont, Texas. Ben DuBose is an NCR district manager.

program resides in main memory only when it is advantageous. Otherwise, that program would choke our operation.

NCR'S DUBOSE:

VRX allows you to run up to 35 jobs simultaneously. It dynamically allocates memory and other resources. It controls virtual memory swapping. It constantly monitors for memory thrashing and program loops. And adjusts the job mix to eliminate them automatically.

BROWN:

VRX also provides Online Program Development. Our EDP manager tells me

OLPD has doubled our programmer productivity.

NCR'S DUBOSE:

System dependability has been important, too.

BROWN:

That's right. System operation is critical to our business. Before we switched to NCR, we talked to other NCR 8500 users and found they had all had excellent experience with this hardware. And with NCR service. We were particularly pleased that NCR had a service office right here in Beaumont.

In the NCR office nearest you, there is an NCR account manager like Ben DuBose who knows your industry and knows NCR systems, including VRX. To learn more about what an NCR system can do for you, phone him at your local NCR office. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

"What is NCR up to now? Find out at Booth 4135. National Computer Conference."



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They end processor obsolescence.

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For example, if you're running MVS, your large-scale system is probably so jammed with critical work that it's hard to get system time to write and test new programs. The solution is a Magnuson M80 dedicated to MVS program development. It provides full MVS capability, but the price tag is just a fraction of what you would pay to duplicate your existing MVS-based system.

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Magnuson's Strategic Architecture makes it all possible. Its bus structure lets you expand in manageable increments, simply by adding more memory or channels. And it gives the M80 a capacity of 16 million bytes of main memory and 16 channels, so you have plenty of room to grow.

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Protecting Your Investment- Sensibly

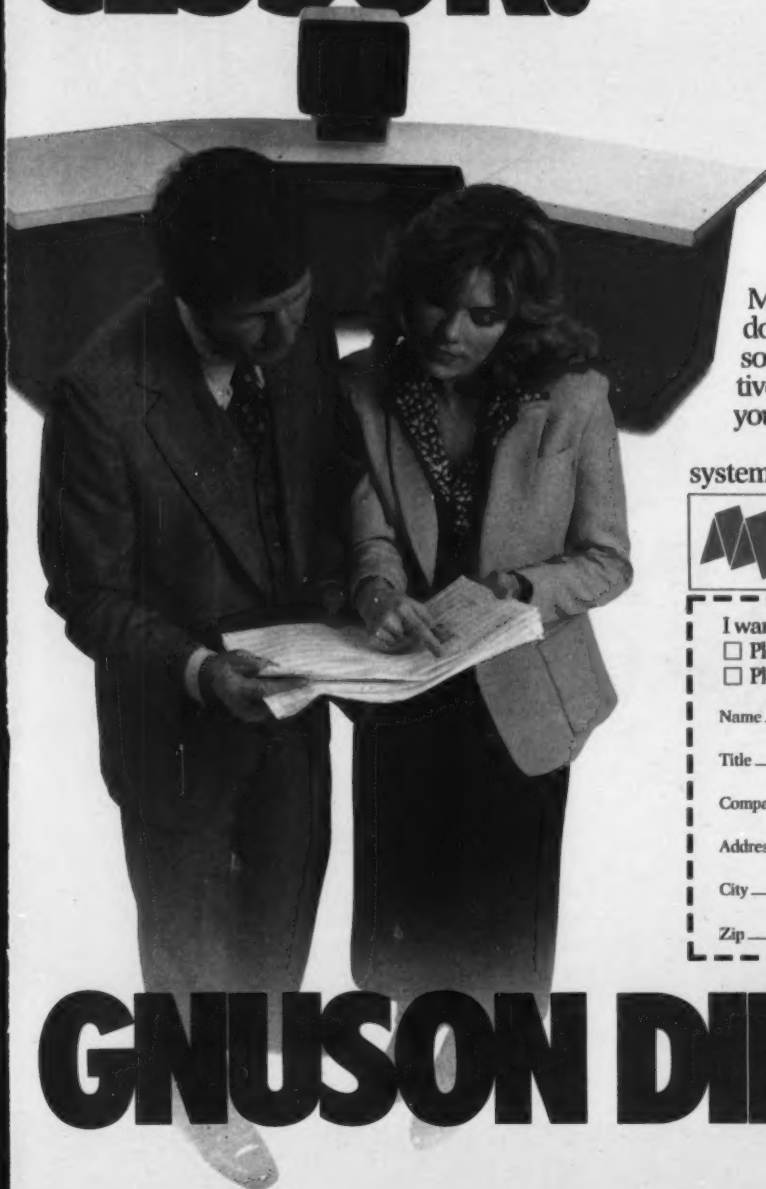
Strategic Architecture also protects the investment you've made in software, training, and hardware.

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Terminals at NCC

Fujitsu, Ltd.

ANAHEIM, Calif. — Fujitsu Ltd. will spotlight its M3500 display subsystem, its M2310 series of microdisk drives and its M3020, M3021 and M3022 line printers at Booths 3406 through 3416.

The M3500 display subsystem is an IBM-3270 compatible, general-purpose unit that includes the M3501, a remote-type cluster controller; the M3502, a local-type cluster controller; the M3511, a four-part device adapter; the M3522, a monochromatic display; the M3524, a trichromatic display; the M3535, a typewriter-like keyboard; and the M3561, a dot matrix impact serial printer.

With the M3524, programs for the monochromatic IBM 3277 and 3278 CRT terminals can be run without any modification, except that data is displayed in three colors corresponding to the program-defined field attributes for operator convenience, Fujitsu said.

When operated with customer-designed screen editing programs, the M3500 provides a variety of display functions.

Monochromatic CRT

The M3522 is a nonglare monochromatic CRT equivalent to the IBM 3278-002 and 3272-002 CRTs. It operates under the M3501 cluster controller, according to the firm.

The M3561 is a 9 by 9 dot matrix printer with tabletop design. It can be connected to the M3051 and M3502 cluster controllers.

Equivalent to the IBM 3278, 3286 and 3284 printers, it prints bidirectionally at 180 char./sec for a 96-char. set.

Fujitsu's M2310 series of microdisk drives are Winchester-type 8-in. rigid disk drives featuring a recording density of 9,400 bit/in. and 680 track/in. with 32.2M-byte and 75.2M-byte unformatted capacities. Two models are offered: the 32.2M-byte M2311 and the 75.2M-byte M2312.

The drives sport fast access time, high reliability and lower power requirements, according to the vendor.

The M3020, M3021 and M3022 line printers provide

290-, 820- and 1,100 line/min printing, respectively, with improved print hammer characteristics on up to six-part forms, simplified mechanical design, reduced adjustment

requirements and self-diagnosis functions for reliability, Fujitsu claimed.

The printers also feature automatic typeface cleaning, expanded forms width, fine

forms adjustments, enhanced throughput and fewer ink ribbon changes, the firm said.

Fujitsu's New York office is at 680 Fifth Ave., New York, N.Y. 10019.



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Terminals at NCC



Racal-Milgo, Inc.

ANAHEIM, Calif. — An IBM 3270-compatible terminal system will be shown by Racal-Milgo, Inc. here at Booth 2418. The 4270 series clustered terminal system is

said to cost up to 25% less than its IBM counterpart.

The system consists of the 4274 system controller, the 4278 CRT terminal and two models of printers. It emulates

the operating characteristics of the IBM 3274 control unit and the 3278 Model 2.

The link to a mainframe is accomplished using either Bi-synchronous or Synchronous

Data Link Control/System Network Architecture (SDLC/SNA) at speeds from 2,000- to 9,600 bit/sec. Within the terminal network itself, the controller can reportedly support any combination of up to 32 CRT stations and printers connected up to 5,000 ft from the controller.

Control Functions

Control functions are performed in the 4278 system controller by a 16-bit microprocessor. Additional 8-bit processors are dedicated to input/output functions, Racal-Milgo said.

An initial program load procedure from the 4270 control panel loads system programs from an integral diskette in preparation for execution.

A controller with four CRT stations and one 160 char./sec printer costs \$27,190 or leases for \$696/mo on a one-year plan, Racal-Milgo said from 8600 N.W. 41 St., Miami, Fla. 33166.

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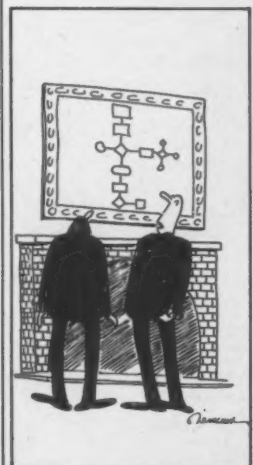
Of course, the terminal is every inch an information management problem-solver that transmits at speeds from 2400 to 9600 bps efficiently and has built-in diagnostics and greater hardware flexibility.

Its microprocessor-based controller interconnects with up to 32 devices. Eight of them can be printers which can be located up to 2000 feet away from the controller. Keyboard displays can be up to a mile away.

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Terminals at NCC

Digi-Log Systems, Inc.

ANAHEIM, Calif. — A portable CRT terminal that fits under an airline seat — Digi-Log Systems, Inc.'s Telecomputer II — will be shown at Booths 1408 and 1410.

Contained within a briefcase-sized case are a 5-in. CRT, teletypewriter style keyboard, 300 bit/sec acoustic modem and display and communications controls. The

unit weighs 23 lbs and uses 30W of power — 20% of the power used by most portable printers according to Digi-Log.

The Telecomputer II can be

used for file inquiry and update from the field, classroom instruction, student programming, production programming, demonstration of products and services and interac-

tive problem solving.

Data rates are switch-selectable from 50- to 9,600 bit/sec in half or full-duplex mode with asynchronous Ascii discipline. Current-loop and RS-232C interfaces are available when the user wants to operate at speeds greater than 300 bit/sec.

Scrollable Screen

The 16-line screen can be scrolled and the normal 80-char. line can be changed to a 40-char. line for greater clarity from a distance.

Optional features include highlighting and blinking for fields or characters. Odd, even or no parity is switch-selectable.

The Telecomputer II's base cost is \$1,395. Digi-Log is located on Babylon Road, Horsham, Pa. 19044.

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Datamedia Corp.

ANAHEIM, Calif. — In Booth 1149, Datamedia Corp. will feature a hands-on exhibit of the DT80/5, DT80/1L and DT80/5L — the newest members of its Series 80 smart terminal family.

The DT80/5 combines the APL character set with full compatibility with the Digital Equipment Corp. VT-100. Tagged at \$2,395, it is the first available 132- APL CRT terminal in its price class, Datamedia said.

The DT80/1L and DT80/5L, 15-in. CRT monitor models, increase the usable display area to nearly twice that of the standard 12-in. diagonal monitors and provide a larger character display and greater readability in either APL or 132-char. column environments, Datamedia claimed.

Standard Features

Standard features include switchable 80 or 132 columns, split screen, partial screen smooth scroll, double-wide and double-high characters, a special graphics character set, a flexible keyboard-entered setup feature with answer-back message, user-definable alternate character set and Ansi-standard protocol.

Series 80 terminals also offer bold characters, blink, underline and reverse video, plus an auxiliary port providing printer control.

Datamedia is located at 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

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Systems at NCC

IBM

ANAHEIM, Calif. — IBM will display several products here in Booth 2621 including the 3101 Display Terminal used for displaying up to 1,920 alphanumeric characters; the 3279 Color Display Station, a high-quality color CRT for displaying alphanumeric data; and the 4341 processor.

IBM's General Systems Division will be showing its System/38. Demonstrations of that system's data base capabilities will include an on-line order

entry program and an airline reservations application.

The 5520 Administrative System will also be shown. Demonstrations will highlight text processing and electronic document distribution capabilities, IBM said.

The 5280 Distributive Data System will feature an order entry demonstration highlighting the systems intelligent data entry function.

The IBM Office Products Division

will be displaying the Audio typing unit, designed for use by blind typists. The unit produces synthetic speech with unlimited vocabulary and can be attached to any of four IBM magnetic media typewriters.

The IBM Electronic Typewriter 75 uses a microprocessor to perform many typing tasks automatically. It features self-contained 7,500-char. memory with optional additional 8,000 char. of storage.

The 6670 Information Distributor will also be shown. The unit prints with a laser and electronically receives and transmits documents over telephone lines, linking word processing to data processing.

Nanodata Computer Corp.

ANAHEIM, Calif. — Nanodata Computer Corp. will demonstrate its line of IBM plug-compatible processors in booths 3015, 3017, 3019 and 3021.

The QMX 6300 series offers alternatives to users of mid-range IBM 370s, 4300s and other systems in that performance range, the firm said. This family replaces Nanodata's previously announced VMX 200 and VMX 400 plug-compatible systems, which are being restructured toward the system-compatible market.

The QMX 6300 series consists of three processors which are sold without peripherals.

The QMX 6336 is equivalent to 130% the power of an IBM 370/148, the firm claimed. Main memory capacity ranges from 1M- to 4M- bytes in 1M-byte increments. Memory cycle time is 495 nsec per 8 bytes. Machine cycle time is 175- to 350 nsec, with simultaneous multiple-instruction processing capability.

Standard on the system are one integrated byte multiplexer channel and two integrated block multiplexer channels. Two additional block multiplexer channels can be added. Channel data rates of 50K bytes/sec in the byte mode and 2M bytes/sec in the burst mode can be achieved on individual channels. The aggregate data rate is 8.05M byte/sec, the firm said.

The second processor, the QMX 6333, provides up to 1.7 times the performance of an IBM 4331 and provides greater memory and channel capacities, the firm claimed. Main memory ranges from 512K bytes to 2M bytes. One integrated byte multiplexer channel and up to two integrated block multiplexer channels are available. The 6333 can be upgraded to the 6336 or the 6343 processors, the firm noted.

The third CPU, the QMX 6343, offers up to 1.1 times the performance of an IBM 4341, the firm maintained. Main memory capacities range from 2M- to 4M bytes and integrated multiplexer channels will be offered.

The 6333 will be ready for delivery in January 1981, and the 6343 will be ready for shipment later that year.

The QMX 6336 is priced between \$163,000 and \$212,000 for systems configured with between 1M and 4M bytes of main memory. The 6333 will be priced between \$98,000 and \$123,000. Pricing for the 6343 was not disclosed.

Nanodata is headquartered at One Computer Park, Buffalo, N.Y. 14203.

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Systems at NCC

Univac

ANAHEIM, Calif. — Univac will demonstrate its recently introduced System 80 in Booth 1455. In addition, Univac will feature its V77-800 minicomputer operating in both local and distributed processing modes.

Another key demonstration will include the firm's UTS 400 programmable terminals linked to a multiple-host Telecon network utilizing the V77 pass-through capability.



The System 80

System 80 is a mid-range mainframe system which offers capabilities normally found only in larger systems, the company noted. The system uses microprocessor-oriented hardware with faster, more reliable emitter-coupled logic and large-scale integration circuit design.

System 80's operating system is known as OS/3, already in use on other Univac processors. Used with System 80, this operating system supports 14 levels of multiprogramming, numerous ease-of-use services, a range of programming languages and systems for transaction and data base processing.

The V77-800 was designed for both scientific and commercial user. It can operate as a stand-alone system or as part of a distributed network with Univac or IBM mainframes.

During the conference, the V77 will be used to demonstrate the Vortex Interactive Package with the QL/77 inquiry language, which enables the user to access the Total

data base in an interactive mode.

In addition, a number of UTS 400 programmable terminals will demonstrate host-to-host access between large-

scale systems in Univac facilities in Salt Lake City, Utah, Eagan, Minn., and Blue Bell, Pa.

The UTS 400 is a general-purpose intelligent terminal

which can operate as a remote terminals station or as a cluster of stations.

Univac can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

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Jim Cron, General Sales Manager, Peripheral Systems Marketing

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patibility problems. It is totally compatible with all IBM 3330/3350 disks and controllers. Our Storage Controller lets you intermix 100MB, 200MB, 317.5MB, 400MB, 635MB — even Mass Storage all on the same unit.

Besides technical considerations, there are many other reasons that make the 33502 a better business decision. Control Data's reputation is for reliability, service support and broad product experience. And there are more reasons. For the full story contact your local representative, or call 612/553-4158.

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VAX Virtual Memory. Ask any user.

"We were looking for large program capacity. And VAX ran circles around the competition."



*Skip Little,
Supervisor of Systems Analysis and
Systems Programming,
VAX Computer Group,
Woods Hole Oceanographic Institution,
Woods Hole, Massachusetts*

Scientists at the Woods Hole Oceanographic Institution gather massive amounts of data about the earth's oceans. But until recently the only way they could analyze much of that data was by sending magtapes to and from a giant Cray 1 computer located 1800 miles away.

So the Institution decided to buy its own VAX from Digital.

Here's what Skip Little, Supervisor of Woods Hole's VAX Computer Group, has to say about VAX program capacity: "Some of the smaller versions of Cray modelling programs can actually be run on VAX. That's remarkable because the Cray 1 computer is the world's most powerful commercially-available system."

Now the problems they had in doing large data analysis and timesharing simultaneously are a thing of the past. Says Little, "We're able to lock our biggest jobs — like synthetic seismogram generation and fluid dynamical modelling — into VAX's main memory, while other timesharing users can be handled by the virtual memory system."

And Little has found that program conversion is a breeze: "We've converted programs from practically every kind of computer you can imagine with great ease."

"With VAX's virtual memory, there isn't a PC board around that's too large for LASAR to handle."

*Fred Grant,
LASAR Product Manager,
Teradyne, Inc.,
Boston, Massachusetts*





Teradyne, Inc. makes a wide range of automatic test equipment including computer-based systems for testing printed circuit boards. To help their customers program the most complex of these PC board test systems, Teradyne developed a sophisticated software package called LASAR.[™]

But until Teradyne looked at Digital's VAX-11/780, LASAR was only available to customers through a timesharing service on a large batch-oriented mainframe. The software package was just too big for anything less.

Now with LASAR running on VAX, Teradyne will have the program capacity they need, in a system their customers can afford to purchase.

"When you reach the limit of main memory, VAX automatically puts the program into virtual memory," Grant says. "That's a key factor in our LASAR development work. Test programmers can develop more complete programs without being limited by memory size."

Has Teradyne sacrificed performance by switching from the mainframe?

"Definitely not," says Grant. "In our benchmarks, VAX matched up one-to-one with the mainframe. That really impressed us."

And VAX's interactive capability should be a big plus for Teradyne's customers: "Several people can program on VAX simultaneously, and they can monitor the progress of their programs as they work."

"There's more programmer involvement with VAX, and more efficiency too."

"Without Digital's VAX, our specialized design work just wouldn't be as cost effective."

*Stephen Tritter, Senior Principal Engineer,
Engineering Computer Facilities,
E-Systems, Inc., ECI-Division
St. Petersburg, Florida*

The ECI Division of E-Systems, Inc., designs high-technology electronics and communications equipment for the U.S. Government. And that requires huge computer programming space.

So virtual memory capability was an important factor in the E-System decision to buy a VAX.

"We're doing a lot of work now that we couldn't have done without Digital's VAX," says Steve Tritter, Senior Principal Engineer.

"For example, we use the VAX to help us design our own LSI integrated circuit chips. That means keeping track of thousands of points, each with several different characteristics. It's a big job."

"And while that analysis is running, other people are performing high-frequency radio propagation studies using as many as 210,000 memory locations, or running Fast Fourier Transforms with up to 8,000 points."

Tritter says that ECI regularly has 10 to 12 engineers working interactively on VAX at a given time.

"We're very happy with VAX system performance," he adds. "We expect to add more memory, and eventually service 50 to 60 simultaneous users."

Digital's VAX-11/780, with its 4 billion bytes of virtual memory, has set a new standard for program capacity. This means you can run large programs easily on VAX, with a potential for growth that's unmatched in the industry.

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Ext. 6885.

B-5-12-0

digital

Peripherals at NCC

Techtran Industries, Inc.

ANAHEIM, Calif. — Techtran Industries, Inc. will show intelligent data recorders at Booths 1353 through 1357.

The Model 816, 817 and 818 single-cassette systems and Model 822 dual-cassette system will also be on view.

Also on display will be Techtran's Model 950, 980, 951 and 981 minidisk systems, the vendor said from 200 Commerce Drive, Rochester, N.Y. 14623.



Shugart Associates

ANAHEIM, Calif. — Shugart Associates will demonstrate at Booth 2642 both a 58M-byte, 14-in. Winchester disk drive and a disk controller that handles Winchester drives and floppy disks com-

bined.

The SA4100 Winchester drive doubles the performance of the firm's SA4008 29M-byte disk drive while retaining the same size as the rest of the SA4000 series.

The SA4100 is claimed to have a transfer rate of 7.1M bit/sec, an average access time of 65msec and an average latency of 10.1msec. Errors rates are quoted as one per 10¹⁰ bits for soft read errors, one per 10¹¹ bits for hard read errors and one per 10⁹ bits for seek errors, the firm said. Mean-time-between-failure is quoted at 8,000 hours.

Shugart's microprocessor-based disk controller, the SA1400, is said to relieve many host system disk control functions to speed up performance and overall system throughput. It can reportedly handle combinations of 8-in. and 14-in. Winchester drives as well as Shugart's own SA800 and SA850.

Functions include overlapped seek operations, integral data separators, automatic switching of head and cylinder and optional track formats. The interface between the single-board controller and the host CPU can be accomplished within three days for all major minicomputer and microcomputer systems, according to the firm.

Shugart is located at 435 Oakmead Parkway, Sunnyvale, Calif. 94086.

MODEL 132-1

The Difference is Clear!

132 columns	underline	8 function keys	row & col cntr	half & full dplx
132 COLUMNS		8 FUNCTION KEYS		HALF & FULL DPLX
132 columns	blink	8 function keys	current loop	half & full dplx
132 COLUMNS	BLINK	8 FUNCTION KEYS	CURRENT LOOP	HALF & FULL DPLX
24 LINES				AUTO REPEAT
24 lines				auto repeat
24 LINES				AUTO REPEAT
24 LINES	dual intensity	numeric pad	menu set-up	auto repeat
24 LINES	DUAL INTENSITY	NUMERIC PAD	MENU SET-UP	AUTO REPEAT
	dual intensity		menu set-up	
STATUS LINE	DUAL INTENSITY	CURSOR CTRL	MENU SET-UP	VT-100 OPTION
status line	dual intensity	cursor ctrl	menu set-up	vt-100 option
STATUS LINE		CURSOR CTRL		VT-100 OPTION
status line	underline	cursor ctrl	row & col cntr	VT-100 option
STATUS LINE	UNDERLINE	CURSOR CTRL	ROW & COL CNTR	VT-100 OPTION
	underline		row & col cntr	
132 COLUMNS	UNDERLINE	8 FUNCTION KEYS	ROW & COL CNTR	HALF & FULL DPLX
132 columns	underline	8 function keys	row & col cntr	half & full dplx
132 COLUMNS		8 FUNCTION KEYS		HALF & FULL DPLX
132 columns	blink	8 function keys	current loop	half & full dplx
132 COLUMNS	BLINK	8 FUNCTION KEYS	CURRENT LOOP	HALF & FULL DPLX
	blink		current loop	
24 LINES	BLINK	NUMERIC PAD	CURRENT LOOP	AUTO REPEAT



The model 132-1 introduces a new high in 132 column display quality with functional versatility at an economy price. The partial list of features are shown as actually displayed on a 132-1 with the Datagraphix patented Charactron[®] cathode ray tube.

An exceptional new terminal.

Compare. THE DIFFERENCE WILL BE CLEAR.

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P.O. Box 82449 San Diego, California 92138 (714) 291-9960

Datagraphix

a General Dynamics subsidiary

Applied Data Communications

ANAHEIM, Calif. — Applied Data Communications will show its line of intelligent disk subsystems in Booths 242 and 244.

The Series 90 subsystems are said to perform file management functions usually contained only in operating systems.

The Series 90 is offered either with an RS-232 or IEEE 488 interface and for either traditional (head/track/sector) operation or file management operation, the company said.

Standard Formats

Floppy disk drives handle all standard IBM single and double-density formats, the vendor said.

The Series 90 controller/formatter uses a microprocessor that enables the vendor to adapt the subsystem to unique application requirements, it said from 14272 Chambers Road, Tustin, Calif. 92680.

Peripherals at NCC

Eastman Kodak Co.

ANAHEIM, Calif. — Eastman Kodak Co. will be introducing four accessories for the Recordak Reliant 750 microfilmer in Booth 1419.

In combination with Kodak IMT microimage terminals, the accessories enable customers to search up to three levels of indexed information, according to the company.

The accessories allow the microfilmer to expose up to three different size image marks along the edge of the microfilm automatically as documents are being filmed. This will enable the Kodak IMT microimage terminal, when properly programmed, to search from the image marks on the microfilm, according to a spokesman.

The primary accessory is the intelligent controller. This accessory, installed inside the microfilmer, is a microcomputer capable of receiving signals and translating those signals into microfilmer operations. The intelligent controller is programmed with 13 programs at the factory, any four of which can be selected for use with the microfilmer.

The microfilmer operator can select which of the four programs is needed for the immediate application.

The second accessory is the document sensor. This device automatically senses a special bar code patch, which is printed on the lead document of a batch. When the patch is sensed, the microfilmer can be commanded to change the size of the image mark near the next image it photographs to the next larger size to identify the lead document image to the retrieval terminal.

An image marker, the third accessory, is capable of producing image marks of any of three different lengths as instructed by the controller. It can be instructed to produce "no mark," or a small, medium or large mark as documents are fed, according to the company.

A document sensor/imprinter, which combines the func-

tions of the document sensor and a sequential imprinter, can be substituted for the document sensor mentioned above. This device not only will sense the bar code patch,

causing the controller to change the size of the image mark, but will also print sequential numbers on the documents before they are microfilmed.

The indexing accessories can be retrofitted to Recordak Reliant 750 microfilmers already in the field or ordered on new Reliant 750 microfilmers from the factory.

Kodak will also be demonstrating the latest capabilities of the on-line Komstar 200 microimage processor. The firm is located at 343 State St., Rochester, N.Y. 14650.

From the graphics leader.

Tektronix announces its week-long workshops on 4020 and 4050 Series graphics.



Learn proven methods of increasing your productivity and graphing efficiency.

Roll up your sleeves. The new Tektronix hands-on workshops are geared to help you acquire new skills and to fully understand the capabilities of the Tektronix 4025 Computer Display Terminal, the 4027 Color Graphics Terminal, and the entire series of 4050 desktop computer systems. You'll learn fast with classroom lectures and daily supervised exercises.

The workshops teach standard as well as optional features, with emphasis on graphing and high-resolution graphics, peripherals and software.

Mark your calendar. Workshops open for enrollment are listed below; five days, \$600.00 fee.

Contact Tektronix to register now. To assure individual attention, we've limited enrollment to 12 in each class. You can reserve your space today by calling the IDD Training Registrar collect at (503) 642-8951. Or mail the coupon to:

Tektronix, Inc.
Attention: IDD Training Registrar
53/039
P.O. Box 1700
Beaverton, OR 97075

Tektronix
ELECTRONIC INTELLIGENCE

Please reserve _____ space(s) in your ☐ 4020 ☐ 4050 workshop.

Date: _____
1st preference _____ 2nd preference _____

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

4020 Series Operator Workshops

210	Santa Clara, CA	June 23-27, 1980
211	Rockville, MD	July 21-25, 1980
212	Santa Clara, CA	Aug. 11-15, 1980
213	Rockville, MD	Sept. 29-Oct. 3, 1980
214	Santa Clara, CA	Nov. 3-7, 1980

4050 Series Operator Workshops

125	Santa Clara, CA	June 9-13
126	Rockville, MD	June 15-20
127	Rockville, MD	Aug. 4-8
128	Rockville, MD	Aug. 18-22
129	Santa Clara, CA	Sept. 8-12
130	Santa Clara, CA	Sept. 22-26
131	Santa Clara, CA	Oct. 6-10
132	Rockville, MD	Oct. 13-17
133	Santa Clara, CA	Oct. 20-24
134	Rockville, MD	Oct. 27-31

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Peripherals at NCC

Data Motion

ANAHEIM, Calif. — Data Motion will feature engineered plastic feed tractors in Booths 2808 through 2810.

All tractors use some type of conveyor belt for the drive pins. Data Motion offers infinite-flex life drive belt that is injection-molded in a one-piece endless unit, the vendor claimed.

The belt has been tested at 300 rpm for endurance in excess of 50 million cycles with no evidence of marking, marring, deformation or fatigue, Data Motion said from Pinewoods Industrial Park, Torrington, Conn. 06790.

ANAHEIM, Calif. — Okidata Corp. will introduce three matrix printers, two "under \$750" additions to the Microline series and a Slimline series graphics unit at Booth 2227.

The two low-cost printers, designated Microline II and III, contain two motors and will operate continuously with no duty cycle limitations, the firm claimed. The heavy-duty units for business or hobby are bidirectional, short line seeking mechanisms that

Okidata Corp.

produce 9 char. by 7 char. on standard one-, two- and three-part forms.

The Microline II is an 80-column unit operating at 80 char./sec. Offering higher speeds and accommodating large forms, the Microline III operates at 120 char./sec and accommodates 132-column, 15-in. wide forms.

The small Microline II measures 14 in. wide by 12.2 in. deep by 4.8 in.

are priced at less than \$750 in OEM quantities. Quantity deliveries will start in the fall. All Microline units are available with a selection of three different optional RS-232 interfaces.

The Slimline SLG provides a choice of two dot densities for alphanumeric printing in addition to its 100 by 100 graphics capability. The unit will print routines reports at 400 line/min with a low-density pattern and then switch to a high-density pattern to print correspondence at 120 line/min.

In a graphics mode, the Slimline will reproduce anything that can be displayed on a CRT screen including areas of solid black. Graphs, maps, bar charts and labels can be printed as well as foreign language characters including Arabic, Chinese and Farsi.

All Slimline units include stored program diagnostics and a stored program machine history. The Slimline SLG costs \$3,275 in OEM quantities.

The company will also be showing its CP210 Document/Passbook Printer and 80M-byte Winchester disk drive. Okidata is located at 111 Gaither Drive, Mount Laurel, N.J. 08054.



The Slimline Printer

high. The Microline III is 4.5 in. wider. Both share common spares and both

YOU'RE LOOKING AT ALL THE MINICOMPUTERS THAT WON'T INTERFACE WITH PRINTRONIX PRINTERS.

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More reliability, because Printronix printers have 50% fewer components than mechanical font printers. So there's less to go wrong.

More quality, too, because uniform hammer energy prints one dot row at a time, overlapping each dot to produce solid characters.

And you also get more versatility, because Printronix printers can plot anything: drawings, graphs, bar codes, pie charts and labels.

So, complete the picture for your minicomputer with a Printronix 150, 300 or 600 line-per-minute printer. And put us to the test. If there's a minicomputer we can't support, we'd like to know what it is. For further information, call your local Printronix Distributor listed below.

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Printronix interfaces with these minicomputers and mainframes.

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Summagraphics Corp.

ANAHEIM, Calif. — Summagraphics Corp. will spotlight its Datagrid II computer-aided drafting system, as well as other graphics products at Booths 1345 through 1349.

The Datagrid II includes four models ranging from simple digitizing of graphics materials to a complete interactive drafting system. Each offers optional features that allow the user to customize the system on an individual level, according to the firm.

Systems I and II have standard Basic digitizer software including a set of standard utility routines that permit immediate start-up.

Systems III and IV are stand-alone, Fortran-based, computer-aided drafting systems. They are complete with the hardware and menu-driven software to permit immediate use by non-programmers, the firm stated.

The user can create, preview and edit a sketch on the display and then, with one command, plot a finished drawing on the optional pen or photo plotter.

Also featured will be the Bit Pad One, a data tablet/digitizer; ID: the Intelligent Digitizer; and the Summagrid, a translucent digitizer.

Summagraphics is at 35 Brentwood Ave., Box 781, Fairfield, Conn. 06430.

Nicolet Zeta Corp.

ANAHEIM, Calif. — Nicolet Zeta Corp. will be exhibiting its line of plotters, including the new Model 1453B business graphics systems, in Booths 2265 through 2268.

The Model 1453B plotter features programmable four-pen plotting with full 11-in. wide plotting area, continuous feed paper for unattended multiple-plot operation, built-in microcomputer controller, operator-selectable scaling and rotating of plots via terminal. Both RS-232 and IEEE 488-1975 interfaces are available.

A built-in character generator produces 214 different characters, including upper- and lower-case and APL characters at any angle or slant as well as character shading.

The plotter can be operated either on-line or off-line or remotely via communications lines as a time-shared peripheral. Fortran and/or Basic language plotting subroutines are provided for most processors.

Nicolet Zeta will also be showing the 3653SX digital drum plotter, the 1553 Zeta Incremental Plotter, the 6300 off-line plotting system controller, as well as other hardware units and accompanying software.

The firm is located at 2300 Stanwell Drive, Concord, Calif. 94520.





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See Hazeltine's amazing new line
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**National Computer Conference, Booth 2237,
South Hall, Anaheim Convention Center, May 19, 1980.**



Peripherals at NCC

Data Printer Corp.

ANAHEIM, Calif. — Data Printer Corp. will be highlighting its four-model 3001 series of band line printers with speeds ranging from 150- to 1100 line/min. in Booth 1619.

The four models — the 3901, 3601, 3301 and 3151 — offer speeds of 1,100-, 750-, 370- and 190 line/min,

respectively utilizing a 48-char. font and 900-, 600-, 300-, and 150 line/min, respectively, using a 64-char. font.

The hammer actuator system on the 3001 is similar to that of horizontal font Chaintrain printers and was designed for horizontal stress caused by

horizontal font print impacts, according to the firm.

The 3001 series incorporates both horizontal and vertical fine paper adjustments providing accurate forms positioning control as well as more flexible band technology, the firm stated. The 3001 series uses the 6-pin engaging tractor system, rather than cost-reduced sprocket wheels usually allocated to band printers, the firm explained.

The fully enclosed cabinet which houses both paper entry and exit is said to provide quiet operation. In addition, the series offers a clear-hands ribbon cassette system and continuous operation of the ribbon through the cassette. The cassette ribbon has a life of 30 million characters, the firm maintained.

The four models within the series share a better than 95% commonality, the firm claimed.

The main operator controls are located on the printer's front panel, which features membrane touch control of printer functions eliminating protruding keys and buttons. The status display offers some 40 symbols indicating both operator and field engineering-correctable faults.

The status display can often lead the user to operator-correctable problems, the firm claimed.

A second on-line/off-line panel allows the operator to momentarily interrupt print functions while unloading paper and to reactivate the unit without returning to the primary front panel control membrane.

The firm claims an average mean-time-to-repair of 30 minutes. The printer also includes its own self-test routines.

The 3001 series includes a forms length selector switch, paper-out switch and paper motion detector. All four models will accept paper widths ranging from 3in. to 17.5 in. and up to six-part forms.

Quantity one OEM prices for the 3001 series are \$10,215 for the 1,100 line/min Model 3901, \$7,350 for the 750 line/min Model 3601 and \$5,605 for the 370 lines/min Model 3301 and the 190 line/min Model 3151. Delivery is 60 to 90 days from Data Printer Corp., 99 Middlesex St., Malden, Mass. 02148.

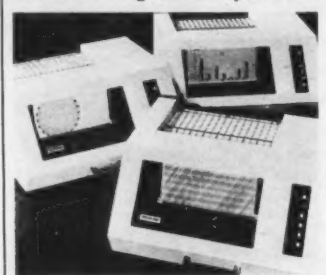


Printronix, Inc.

ANAHEIM, Calif. — Printronix, Inc. will showcase its complete line of 150-, 300- and 600 line/min printers at Booths 1312 through 1316.

These printers utilize an overlapping dot matrix for alphanumeric and graphics, according to the firm. The printers also feature plotting and graphics capabilities as standard items.

The patented system incorporates a forward-striking hammer system that



Printronix Impact Line Printers

forms characters one dot row at a time and overlapping dots vertically and horizontally, according to Printronix.

A single computer command puts the printer into plot mode, enabling it to plot drawings, graphs, charts, any size or shape characters, large labels, bar codes and other images that can be displayed on a CRT from computer commands.

Printronix offers three models of medium-speed impact printers, operating at speeds of 150-, 300- and 600 line/min. The firm is headquartered at 17421 Derian Ave., Irvine, Calif. 92714.

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The LogAbax 1067 is an efficient concentrator/converter which is used to connect ASCII terminals to an SNA/SDLC network.

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new, low cost IBM 3101 CRT and turn it into a low cost SNA/SDLC station.

In either case, you will save on leased lines, modems and 3705 ports while getting terminals you really want.

1067 prices start at \$1,080 per terminal or \$62 per month on a three year lease.

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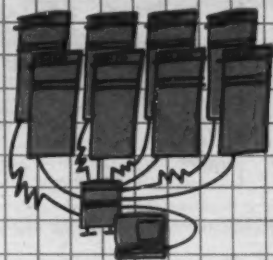
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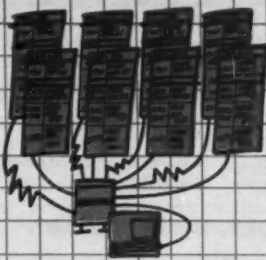
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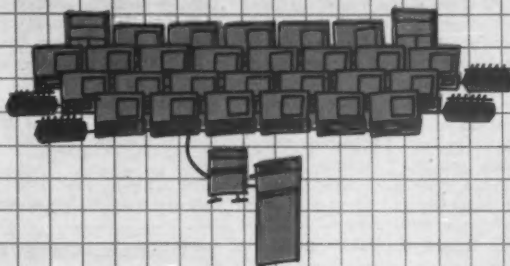
with a computer based terminal system that can communicate
with most IBM host computers and...



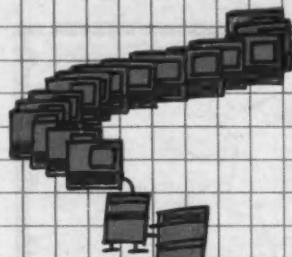
access up to eight IBM host computers,
either local or remote, from a single terminal



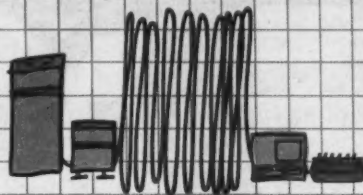
access up to fourteen partitions
—with up to eight partitions per host—
from a single terminal



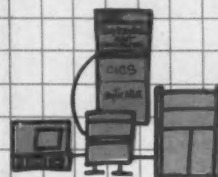
control up to 32 peripherals (card readers,
CRTs, printers and disk drives) with a single system



multi-drop up
to 16 CRTs on one
coax to save cable



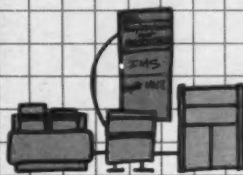
do local processing up to 7,500 feet from the host
computer and save remote connection expense



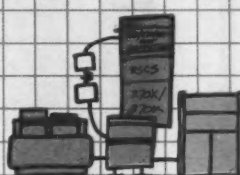
assume the software transparent identity
of multiple IBM systems with a single
computer/controller and look like...
a local interactive communication system



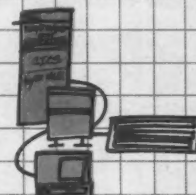
a remote interactive
communications system



a local job entry system



a remote job entry system



a screen editing system

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Minicomputers at NCC

General Robotics Corp.

ANAHEIM, Calif. — Visitors at General Robotics Corp.'s (GRC) Booth 2163 will see a group of additions to its Constellation series microsystems, based on the Digital Equipment Corp. LSI-11.

New products include 8-in. Winchester options for the Gemini and Tristar computer systems, a 90M-byte storage module for the Pegasus system, LSI-11/23 options for all systems in the product line and a four-port serial asynchronous/synchronous interface and a 16-bit parallel I/O interface.

an LSI-11/2 CPU, 64K bytes of random-access memory, hardware bootstrap, line frequency clock and a serial RS-232 I/O port.

All GRC systems are available with RT¹, RSX-11/S, RT-11 or RSX-11/M software licenses, and the various language options include Basic, Basic-Plus-2, Fortran IV and Fortran IV-Plus.

The QLV-11 quad serial I/O interface offers full DLV11-E compatibility

on any of the four RS-232 ports. This standard feature includes auto-answer modem support to Bell-type 103, 113, 202C, 202D and 212 modems.

All ports may also be individually selected to be synchronous serial I/O ports. Transmission rates may be selected by switches for each port individually in the range of 50- to 19.2K bit/sec.

GRC is at 57 N. Main St., Hartford, Wis. 53027.



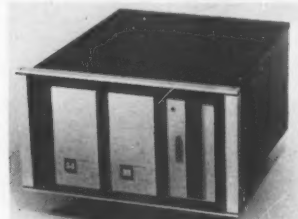
NCC 1980



The Super Tristar

Designated the Super Gemini and Super Tristar, these systems combine an 8M-byte, 8-in. Winchester drive with one of two 1.25M-byte floppy disk drives, respectively, the firm said. The Super Tristar has an additional option for two 8M-byte, 8-in. Winchester drives combined with one 1.25M-byte floppy disk drive.

The GRC Pegasus cartridge disk system can now be configured with a



The Super Gemini

90M-byte storage module option. This Super Pegasus configuration has 75M bytes of fixed disk and 15M bytes of removable disk.

All GRC systems normally include

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High Speed Disk Save PDP-11/RSX, IAS

- Supports all manufacturer's disks
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Minicomputers at NCC

Dosc, Inc.

ANAHEIM, Calif. — Dosc, Inc. will exhibit two computer boards and a soft video board in Booth 3419.

The TCB-85 is a total computer board which can support the following peripherals: printer, CRT, floppy disk, keyboard and serial channel.

The TCB-85 memory map register allows a user to map random-access memory (RAM) into read-only memory (ROM) address space, which allows loading of a transient program into

RAM and its execution from location 0 in RAM, Dosc said.

The MIB-85 memory intensive computer board is a single-board computer designed for applications requiring large program store. It consists of a central processor, programmable timer, system clock, erasable/random-access memory/ROM and a synchronous/asynchronous serial channel.

Other features include a programma-

ble keyboard controller, system bus control logic and a programmable interrupt controller.

The SVB-80 soft video board is designed for applications which require high-resolution graphics and flexible alphanumeric display. The board is capable of displaying virtually any character set and can intermix graphics and characters from multiple alphabets, the vendor said from 175 I.U. Willets Road, Albertson, N. Y. 11507.

Vector Graphic, Inc.

ANAHEIM, Calif. — Vector Graphic, Inc. plans to introduce a single-board computer and a floppy disk drive to show alongside its line of small business systems and software packages at Booth 4305.

The ZCB Microcomputer, which has been available in the firm's microcomputer-based systems, will now be offered separately, while the Dual Stor 2M-byte disk drive, an 8-in. unit, will also be shown. Vector promised that more information would be available at show time.

The firm will demonstrate its integrated turnkey systems as well. Vector is located at 31364 Via Colinas, Westlake Village, Calif. 91361.

A Lasting Relationship.

Intel and Information Resource Management, your family of solutions.

A lasting relationship is exactly what you'll find in Intel's new family of Information Resource Management products. Combining the very best of proven products with Intel's newest innovations in both hardware and software, it's a family which brings an integrated data dictionary, powerful data base management, coordinated data communications, distributed data base facilities, and incredibly efficient data base hardware.

Integrated Data Dictionary: IDD.

Heading up the family is Intel's Integrated Data Dictionary, IDD. An indispensable tool for effective data administration, IDD helps you streamline and control your environment.

IDD is an applications design aid, a documentation vehicle, a way to enforce standards and procedures, a master reference for determining the impact of changes to your data.

Data Base Management: SYSTEM 2000®/80.

Blending the finest enhancements from previous releases with a multitude of advanced facilities, SYSTEM 2000®/80 DBMS is a family member which you, your designers, programmers, data administrators, and end users will all appreciate. Each feature is designed to increase productivity and make your environment as flexible as possible.

Multiple languages. For designers and programmers, there's PLEX, Intel's Programming Language Extension to COBOL, PL/I, FORTRAN and Assembler. And for end users Intel provides QUEST, an easy-to-use (but powerful) English-like language.

Multiple data structures. SYSTEM 2000/80 DBMS indexing and direct access keys provide fast access to relational, hierarchical, and network data structures.

Multiple operating systems and mainframes. SYSTEM 2000/80 DBMS runs on IBM, CDC, Univac, and IBM-compatible mainframes. And Intel was first with a DBMS for IBM's new 4300 series.

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Intel's newest addition is Multiple Systems Coupling, MSC. Providing communications between two or more IBM processors, including the new 4300 series, our MSC software lets you execute applications and transactions in one CPU while accessing data managed by SYSTEM 2000/80 DBMS in another.

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Bringing synergism between hardware and software technologies into our Information Resource Management product family is the FAST-3805 Data Base Assist Processor. With the FAST-3805 Data Base Assist Processor, SYSTEM 2000/80 DBMS transaction throughput capacity can be improved by as much as 100 percent and with a 50 percent or better reduction in response time.

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Data General Corp.

ANAHEIM, Calif. — Data General Corp. at Booth 1339 will be showing its Eclipse S/140 scientific processor with 128K bytes of MOS memory and a prefetch processor.

The firm will also be displaying its top-of-the-line Eclipse M/600 with 128K bytes of memory. A demonstration of DG's data base management system (DG/DBMS) will be conducted on that machine. The M/600 will also be used to demonstrate DG's Xodiac Network Management System based on the X.25 protocol.

In addition, the AZ-Text word processing utility will be demonstrated on DG's Dasher terminals, the vendor said.

An Eclipse C/150 with 1M byte of memory will also be on display along with a Micronova MP/200 and a Commercial Systems CS/50 with 128K bytes of MOS memory. Other DG equipment on display will include terminals, DG/Disk Pack Storage Subsystems, Dasher D/200, DG/Diskette subsystems and cartridge and fixed-head DG/Disk Subsystems, the vendor said from Rt. 9, Westboro, Mass. 01581.

DOS/VS Terminal Printer Spooling BIMSPPOOL

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Minicomputers at NCC

Warrex, Inc.

ANAHEIM, Calif. — Warrex Computer Corp. will display its Centurion line of small and medium-size business systems at Booth 4023.

The Centurion 6000 system is a shared logic processor which uses disk controllers with intelligent microprocessors to perform most overhead involved in disk utilization. This, the vendor said, allows the CPU to devote more time to program execution.

The CPU is designed around a high-

speed 2901 bit-slice microprocessor. This takes advantage of microprocessor technology to build what the vendor calls "a true minicomputer" that has the flexibility to handle most business applications.

Centurion systems are said to support a variety of video devices, disk units and printers. In addition, other peripherals can be added to Centurion systems with little or no hardware or software modification, the vendor

claimed.

The Centurion operating system is multiprogrammable and multitasking. It can support up to 32 user-programmable partitions that can be used in any combination of batch or interactive jobs. Those jobs may share any or all the system's resources, the vendor said.

Also on display will be the Centurion 100, 200 and Centurion III systems.

The Centurion 100 is a flexible

diskette-oriented system with a video display terminal and multitasking features. Its modular design improves reliability and eases expandability, the vendor said.

Centurion 200 provides 10M bytes of fixed/removable rigid disk mass storage plus a video terminal and multitasking. Data communications can also be added to the system, the vendor said.

Like Centurion 200, Centurion III offers the 10M bytes of fixed/removable disk storage, a video display terminal and multitasking. The system is also upwardly expandable. Warrex can be reached through P.O. Box 943, Richardson, Texas 75080.

Applied Digital Data Systems, Inc.

ANAHEIM, Calif. — Applied Digital Data Systems, Inc. (AddS) will show for the first time its AddS Multivision 1, 2 and 3 desktop microcomputers in Booth 1562. The systems were designed for small business users, the firms said.

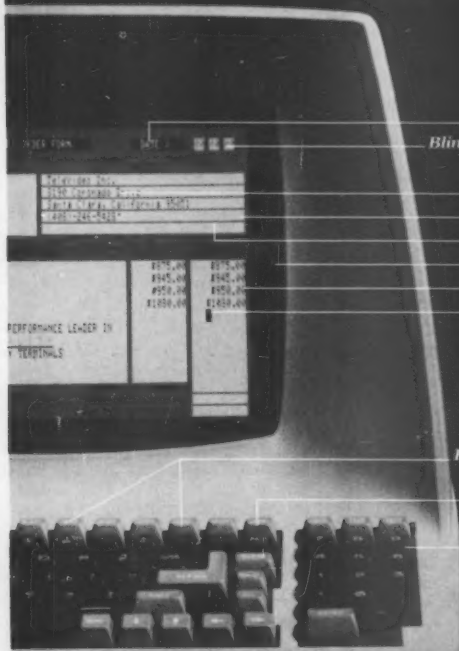
The basic system — Multivision 1 — consists of a 64K-byte micro with 700K bytes of dual minifloppy storage and costs \$3,785. An AddS 60 CRT terminal and printer can be added to form a system for the use in accounting and word processing tasks, the firm said.

Multivision 1 software is available to carry out payroll, billing or inventory applications. Word processing software is also available. Adding an 8-in. Winchester-type drive — either with 5M- or 10M-byte storage capacity — changes the microcomputer to the Multivision 2, which costs under \$8,000 with 5M bytes of storage.

The Multivision 3 is essentially an upgraded version of the Model 2 with an expansion box that supports a four-port adapter and up to three additional 64K-byte random-access memory boards to yield a 256K-byte system. It supports up to four Digital Research Corp. CP/M-compatible programs and can be programmed in Basic, Fortran, Pascal and Cobol. Cost is under \$13,000.

AddS is located at 100 Marcus Blvd., Hauppauge, N.Y. 11787.

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Minicomputers at NCC

Nixdorf Computer Corp.

ANAHEIM, Calif. — Visit Nixdorf Computer Corp. in Booths 4335 through 4345 here, enter and retrieve data from a mainframe using the Nixdorf LK-3000 personal computer, and you may win that personal computer.

Originally designed as a language translator, the LK-3000 now provides expanded capabilities for use in accounting, financial and inventory control applications.

In addition, it can be used independently, with an interchangeable module or as an electronic notepad for stor-

Also on display will be second-generation terminal-based distributed processing systems. The 600 series of five models feature virtual memory, multiterminal operations, synchronous batch and interactive communications (up to 19.2K bytes), print speeds from 45 char./sec to 900 lin/min and mass storage capacity to 264M bytes.

Nidas, an integrated distribution accounting system developed by Nixdorf

for wholesale distributors, makes distribution operations more manageable and increases efficiency and profitability.

For multiple companies and/or warehouses, the package provides graphics sales analysis in addition to order processing, invoicing, accounts receivable, inventory control and purchase order processing.

Nixdorf is at 168 Middlesex Tnpk, Burlington, Mass. 01803.



The Nixdorf LK-3000

age and retrieval of personal data such as phone numbers, formulas, technical terms, phrases or instructions, the firm said.

Nixdorf will also show distributed processing, data entry, word processing and general business systems. The System 480 top-of-the-line data entry system, plus Series 600 distributed processing demonstrations, will be highlighted.

Operating under Advanced Data Entry Executive (Adex), the System 480 provides full concurrency of multiple tasks for up to 32 local and remote terminals.

High-volume data entry, local batch processing, batch and interactive communications, plus multiple security are among the features to be shown.

Harris Corp.

ANAHEIM, Calif. — Harris Corp.'s Data Communications Division will display its yet-to-be-announced 9200 information processing system at Booth 2635.

Also on display will be the 1670 distributed data processing system which is said to perform local and remote batch processing, local and remote interaction and key-to-disk data entry, the vendor said.

An audio-visual presentation will present an overview of Harris' products and will direct listeners to the live equipment demonstrations at the booth, the vendor said from 16001 Dallas Parkway, P.O. Box 400010, Dallas, Texas 75240.

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This means that administrative people can quickly become more efficient because of all the advanced capabilities at their fingertips. And managers and professionals can become more productive because communications will be faster and information will be easier to get.

But total integration is just part of the story. So if you'll stay with us for a few paragraphs, we promise you some very productive reading about a very produc-

tive office system.

We'll begin with the word.

Word Processing.

This is the basis of all automated offices. The main things to look for are ease of learning, ease of use, and the ability to work with documents of any size.

As you may have guessed, Prime's Word Processing system embodies all these features and quite a few more, including a screen editor that displays text as it's entered. Menus that lead the user through the system. Labelled function keys that eliminate the need for heavy user memorization. And system storage capability of over 2 billion characters. Which translates into roughly a million pages of information.

Our Word Processing also has management and administrative workstations that provide fast, consistent response time. Powerful text creation and editing facil-

ities. User created boilerplate library. Comprehensive filing and retrieval capabilities. List processing. And letter-quality output from a printer with interchangeable character fonts. In a word, our Word Processing is productive.

Management Communications and Support.

This part of our Office Automation System is a natural extension of our Word Processing function. Like Word Processing, it's simple to learn and easy to use. And it has all the features you need to enhance productivity.

Electronic Mail, for instance, has in-tray processing, note and memo creating capabilities, receipt acknowledgment, and the ability to annotate received messages and to forward documents and notes to an office down the hall, across the city, or around the world.

1 REDUCING OF TOMORROW EVERYTHING D TODAY.

Correspondence Management cuts paperwork and simplifies filing with its powerful storage and retrieval capabilities.

An Electronic In tray receives and stores notes, documents, and appointment requests.

A Tickler File will remind you that on a given day, a certain task has to be performed.

Calendar Management allows you to maintain a confidential two-month personal calendar.

And Scheduling, which is based on the personal calendar, lets you request a meeting, get confirmation of a specific date and time from all attendees, then actually schedule the meeting.

As you can see, our Management Communications and Support function lets you spend less time on routine jobs, and

allows you to function better as a manager.

Advanced Text Management.

This tremendously helpful function employs a 60,000 word electronic dictionary. The contents are user-defined, so medical, legal, or industry terminology can easily be added. Spelling is automatically compared with the dictionary for accuracy, and hyphenation is done automatically.

It will also support multi-lingual dictionaries for creating foreign language documents or translating one language to another. In other words, *C'est si bon*.

Hardworking Workstations.

Prime's Office Automation System is supported by two workstations; one administrative and one management. They both can access all capabilities of the system, but each is tailored to the specific needs of its users. Together, they make a

highly productive information management tool.

The System operates on a multifunctional Prime 50 Series computer system. All Prime computers share the same operating system, the same file system, and the same communications products. So no matter what size computer you start with, you can move all the way up to a powerful 750 without piling up bills for recompiling programs or modifying software. In fact, your office system can easily and economically grow to support over sixty users.

In short, Prime's Office Automation System can deliver what you need. So if you're ready for this kind of office, we're ready to deliver the System. If you'd like to know more, write Prime Computer, Advertising Department, 3 Newton Executive Park, Newton, Massachusetts 02162.

PRIME
Computer

Minicomputers at NCC

NCR Corp.

ANAHEIM, Calif. — NCR Corp. will display its I-8140 desktop computer system, which uses Ansi standard Cobol and 74 Basic, at Booths 4135 and 4035.

In addition, the firm will show its I-8150 multiple-workstation small business system; Interactive Technique for Effective Management (Item), a software application for wholesale distributors.

The Interactive Manufacturing

Control System (IMCS), a mid-range system for medium-size manufacturing firms, will also be spotlighted at the NCR booth.

Also on display will be Tran-Quest, a query processor system; VRX Tran-Pro, the latest version of NCR's transaction processing monitor; and several terminals including the NCR 2152 retail system, the NCR 2261 teller terminal and NCR 2950 general-purpose terminal, the

vendor said.

A variety of computer output microfilm systems will also be on display, as well as several duplicator systems, NCR said.

NCR's 7750 Remittance Processing System, a document entry and processing system that reads optical character recognition and magnetic ink character recognition documents, will also be shown, NCR said from Dayton, Ohio 45479.

Computer Automation

ANAHEIM, Calif. — Located in Booth 3014, Computer Automation, Inc. will introduce two additions to its Naked Mini line and expanded function for its Scout product line.

The Naked Mini 4/95 is at least 30% faster than any previous CA mini, the firm noted. The 4/95 is intended for the company's traditional OEM users.

On the other hand, the Naked Mini 4/97 was designed as the engine that supports the firm's Protos operating system. Consequently the 4/97, the firm's first end-user product, will be sold only as a bundled system, including Protos.

Protos is a multiuser, virtual-memory operating system designed to be a software development tool. Protos handles three languages: Fortran IV, assembler and Alamo, a proprietary system implementation language.

In addition, Protos supports techniques such as structured programming, a hierarchically structured file system and demand paging virtual-memory management.

Although the 4/97 is sold only as a bundled system, it is essentially the same hardware as the 4/95, CA said. These two products bring several technical and performance innovations to the Naked Mini product line, the firm said.

They feature a page-oriented memory management unit that expands addressability to 8M bytes of error-correcting memory. Both use 50 nsec/2K cache memory that handles about 85% of read and fetch operations that reduce overall access time to about 120nsec compared with the Naked Mini 4/90's access time of 550nsec.

In addition, the systems have added a stack-relative addressing mode and 22 new instructions that operate in this mode. These enhancements contribute to more efficient implementation of block-oriented languages, the firm maintained.

As for the Scout Naked Mini 4/04 mini line, CA is introducing four new single-function boards that provide the Scout with mass storage capabilities, analog output, digital parallel I/O and battery backup with a watchdog timer.

One of the single-function boards acts as the controller for a 512K-byte flexible disk subsystem. This subsystem is format-compatible with all Naked Mini 4 systems.

A second single-board is a 32-bit bidirectional I/O board which, using interrupt-driven programmed I/O, allows the user to divide the 32 bits into four 8-bit groups and program the interface to transfer data in any combinations totaling four groups.

The third board is a four-channel digital-to-analog converter with several output voltage ranges, which are switch-selectable for each channel.

The battery backup board provides temporary power to memory backup; its time ranges from 3 min for 128K bytes to 4.5 min for 32K bytes of dynamic random-access memory.



You are invited to an important seminar for Data Processing Directors, Managers and Senior Professionals directly involved with a responsibility for 4300 installation

"What is involved in converting to DOS/VSE? Should you make the investment when MVS could be available shortly?"

"ICCF gives you not only on-line editing, but also on-line interactive debugging. Are you aware of the significant program and people implications?"

"What are the limitations of a 4300 in a distributed network environment? Are the necessary controls and interfaces in place today?"

"If you have ordered a 3310 and or 3370 DASD, what are the implications for ISAM files?"

"Are the performance claims myths or realities? Will the 4431 really meet your needs?"

Recent user experience, problems encountered in 4300 implementation, combined with rumors that DOS/VSE might be replaced by MVS within two years, could lead managers to the conclusion that the 4300 facilities available today will be very different in two years' time.

SEMINAR ANNOUNCED:

To answer questions such as these, Advanced Systems, Incorporated is pleased to announce a unique one day Management Planning Seminar based upon 4300 installation experiences throughout Europe and the USA. This is your opportunity to benefit from the knowledge gained from those who have already installed the 4300. Their experiences have both raised a number of important issues and can give you significant guidance in implementing your system.

This practical seminar is designed to help you recognize, understand and address these concerns and as such, provides a unique insight into the 4300 systems.

There will be four (4) major sessions:

1) "4300 Hardware—description and assessment"

The first topic describes 4300 hardware in terms of its functions and facilities, its required environment, and its expected performance and maintenance considerations. It also clarifies a number of misconceptions relating to 4300 efficiency.

2) "Converting to 4300 Software"

In this session we will examine the DOS/VSE, VSI and VM Control Programs and their available licensed products. Problems which are inherent in conversion and updating to these operating systems will be described from field experience and discussed in some detail. System IPO/E will be described and problems that have been encountered, which have caused some people to abandon the SIOPE environment, will also be examined.

3) "Local and Remote Interactive Facilities"

In this session there will be discussions covering the 4300 in an interactive environment. Special attention will be paid to the interactive products of DOS/VSE, ICCF IPS, and ICPS. The impact and limitations of ICCF with multiple users will also be addressed as well as the interrelationships between ICCF and other interactive packages (for example CICS).

4) "Support and Future Trends"

In the final session the following questions will be discussed: What kind of support can be expected in light of the remote support facilities—does this represent a significant shift in IBM policy? What are the people resource requirements and therefore, training implications? What growth paths will be available to 4300 users? What planning will be required? Finally, is there any truth to the speculations that MVS will become a 4300 standard in the next two years? What other hardware options are likely to be announced?

SEMINAR HOSTS

ASI is hosting this seminar in cooperation with Allergo, Limited, a leading international consulting group who were one of the first IBM 4331 installations in Europe in 1979. The seminar leader is Mr. John Ennever, a Senior Consultant, from London, England.

WHEN AND WHERE

(all one-day sessions are beginning at 9:00 a.m.)

May 28	Toronto	Isle in The Park
May 29	New York	Sheraton-New York
May 30	Chicago	Continental Plaza Hotel
June 2	San Francisco	St. Francis Hotel
June 3	Los Angeles	Bonaventure Hotel
June 6	Houston	The Houston Oaks
June 8	Atlanta	The Omni

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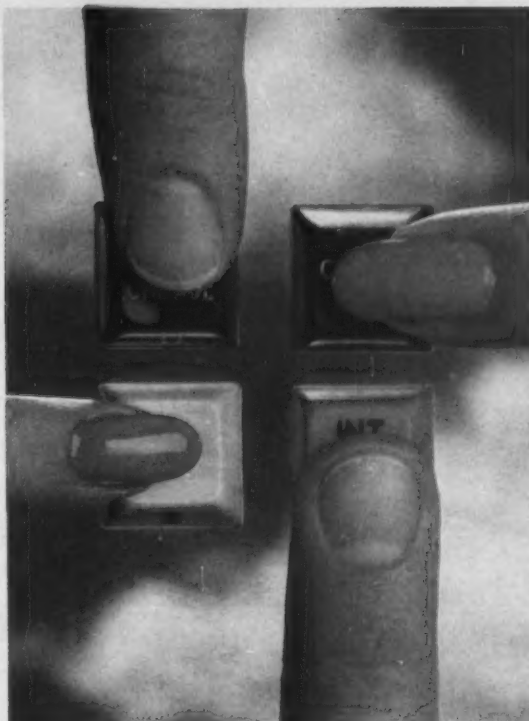
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You'll give it extra points for software flexibility. You can take advantage of the new

GCOS 8 operating system, Data Management-IV (DM-IV) Transaction Processor, COBOL-74, and Integrated Data Store/II (I-D-S/II) Data Manager.

For more information, write Honeywell, 200 Smith Street (MS 487), Waltham, Massachusetts 02154.

Or better yet, see the DPS 8/20 making its debut at NCC. Check out its data base and transaction processing capabilities. Hands on.

Honeywell

Mini Peripherals at NCC

Sweda International, Inc.

ANAHEIM, Calif. — Two families of Sweda International, Inc. printers and paper tape systems will be introduced in Booths 1301 and 1303.

The Model MS-4000 Single Station A/N Slip Printer uses alphanumeric characters. A dot matrix head prints "in flight" and has bidirectional print capability.

The unit is cam-operated and has an independent friction paper feed which provides positive paper transport of

single or multiple-part forms and form sets.

The MS-4000 prints 40 characters at 12 char./in. and produces two lines per second. Individual units cost \$210 and groups of 50 to 100 may be purchased for \$124 each.

Alphanumeric Printer

The Model MR-1824 is also an alphanumeric printer using a dot matrix with 5 char. by 7 char. print heads. It

features the "in flight" capability of the MS-4000 and has bi- or unidirectional capability.

The unit's right station features selective print to 24 characters and automatic paper feed, while the left station has selective print to 18 characters, automatic take-up and paper feed inhibit. The single unit price is \$250 and drops to \$143 for orders of 500 to 1,000.

Sweda is also offering several paper

tape systems that include reader punch, punch-only and read-only capabilities.

These systems are discounted from 2% for purchases of 6 to 10 to 12% for purchases of 151 to 200.



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MDB Systems, Inc.

ANAHEIM, Calif. — MDB Systems, Inc. will introduce two communications interfaces for Digital Equipment Corp. computers in Booth 2117.

One is the first compatible interface ever offered for Q-bus CPUs and makes "big system" protocol handling, error checking and other capabilities of the DEC DUP-11 available to the low-cost system user, MDB claimed.

The second is DUP-11-compatible for Unibus computers and offers a significant performance upgrade over existing products, the vendor added.

Both synchronous, single-line interfaces are functionally equivalent and software-compatible with the DUP-11 and provide parallel-to-serial and serial-to-parallel data conversion, EIA level conversion, modem control for full- and half-duplex operation, protocol management and bus interface, MDB said.

The interfaces have data rates up to 500K bit/sec and accommodate Bisynchronous and DDCMP byte-oriented protocols and Synchronous Data Link Control, ADCCP and High-Level Data Link Control bit-oriented protocols.

Among the "big system" characteristics of the MDB interfaces are error control features including CRC-CCITT preset to zeros or ones, CRC-16 preset to zeros or VRC odd or even. For a Q-bus-oriented computer user, such hardware error checking saves significant time and memory compared with the software error checking used with other systems, MDB claimed.

The MDB interfaces are contained on a single quad board. For the Q-bus, all signal handling is confined to the A and B slots for maximum integration flexibility.

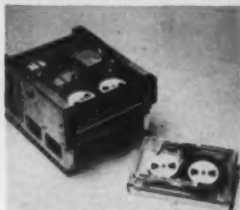
The Q-bus model costs \$950 and the Unibus model sells for \$1,200, MDB said from 1995 N. Batavia St., Orange, Calif. 92665.

Mini Peripherals at NCC

3M Co.

ANAHEIM, Calif. — The HCD-75 High-Capacity Cartridge Drive and its cartridge, which provide 74M bytes of user data storage capacity, will be shown by 3M Co.'s Minicom Division at Booth 3000.

The unit provides a higher capacity than any current



The HCD-75 Cartridge Drive

.25-in. cartridge system, coupled with a continuous information transfer rate of 20K byte/sec, the vendor claimed. It can be used as a backup for fixed disk drives such as the

8-in. and 14-in. Winchester-type disk drives or for program distribution, data interchange, journal and archival applications.

The higher capacity — 48 times that of the present data cartridge developed by 3M — is achieved through the combination of a new 16-track drive, special magnetic tape and new recording methods, according to 3M.

The drive utilizes a single-track, ceramic read, write head that is microprocessor-controlled. Data is written or read in a "serpentine" mode to eliminate rewinds.

Higher capacity also results from the DC600HC formatted High-Capacity Data Cartridge that contains 600 ft of specially formulated tape and from recording information in contiguous prerecorded data blocks defined by forward/reverse reading block keys,

eliminating the need for inter-record gaps.

Streaming Mode

In the streaming mode, with continuously running tape, an average rate of 20K byte/sec is claimed. A 4M byte/sec transfer rate is the maximum achieved in the burst mode, unloading into an integrated buffer storage system, the firm said.

The HCD-75 can be interfaced to either a processor-controlled channel or a direct memory access (DMA) channel. One microprocessor-controlled module can direct one to four cartridge transports, if such a configuration is desired. Interchangeability and transportability of data cartridges can be accomplished.

Deliveries will begin in the second quarter of 1980. The HCD-75 costs \$2,150; the price for additional drives is

\$1,050. The cartridge costs \$30, according to 3M at Department MN80-8, Box 33600, St. Paul, Minn. 55133.

Rianda Electronics, Ltd.

ANAHEIM, Calif. — Rianda Electronics, Ltd. will show several of its controllers for Digital Equipment Corp. and Data General Corp. minicomputer systems in Booths 212 and 214.

Among the entries are a DG 6060 series emulator that Rianda said is software-transparent and capable of controlling any disk drive carrying a storage module disk (SMD) interface. The single-board controller has error cor-

rection, controls devices with capacities ranging from 80M to 1,200M bytes and can operate drives from a mixture of vendors, a spokesman noted.

The device emulates DG's 6060, 6061 or 6067 disk systems and is priced at \$2,250 in OEM quantities.

Tape Adapters

The company will also display its magnetic tape adapters for both the DEC PDP-11 and LSI-11 process-

ors. These adapters are said to be capable of functioning with any tape drive equipped with an industry-standard format-

ter. For example, streamers, cartridge tape, group code recording and standard tape drives can be controlled with the adapters, the spokesman said. Both units are software-transparent with DEC's operating systems and sell for \$800 each in OEM quantities.

Rianda is located at 2535 Via Palma, Anaheim, Calif. 92801.

Emulex Corp.

ANAHEIM, Calif. — Emulex Corp. will exhibit its two recently introduced tape controllers — the TC01 and the TC70, designed for Digital Equipment Corp.'s LSI-11 micro and PDP-11/70 mini, respectively — at Booths 3415 and 3417.

The TC01 dual-density controller and formatter for the LSI-11, 11/2 and 11/23 microcomputers provides compatibility with DEC's TU10/TM11 tape subsystems. The device also supplies software-transparent operation for any standard reel-to-reel magnetic tape drive that operates at speeds up to 75 in./sec, a spokesman stated.

The TC70 meets the high-density group code recording (GCR) formats required with the PDP-11/70, Emulex said.

It functionally emulates the TM03/TU45 controller from DEC and comes in two models — the TC70/A which supports Telex 6240/6250 tape transports, and TC70/B, which handles Storage Technology Corp. 1921, 1951 and 1953 tape transports.

Emulates DEC

In either configuration, the controller will emulate both the DEC TWU45 and the TWU77 tape subsystems, recording at speeds up to 126 in./sec and densities up to 6,250 bit/in.

In addition to these two products, Emulex will show its full line of large disk controllers and its TC11 magnetic tape controller for the PDP-11, the firm said from 2001 E. Deere Ave., Santa Ana, Calif. 92705.

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Mini Peripherals at NCC

Dataram Corp.

ANAHEIM, Calif. — Bulk semiconductor memory with dual-port capability for the Digital Equipment Corp. line of processors will be featured by Dataram Corp. in Booth 2221 here.

The 8M-byte Bulk Semi units have an unusual number of combinations of port interfaces available, Dataram said. Port interfaces can be a combination of LSI-11, PDP-11 or PDP-11/70 interfaces or special customer interfaces which allow the use of such equipment as array processors or data acquisition systems on one of the ports.

The specific interfaces offered by Dataram include its fixed-head disk emulation interfaces to emulate DEC's RF-11 and RJS03 fixed-head disk systems. For example, a DEC user can interface both an LSI-11 and a PDP-11/70 to Dataram's Bulk Semi, with the LSI-11 interfacing to the Bulk Semi as if it were an RF-11 and the PDP-11/70 treating it as an RJS03.

Non-DEC equipment can also be interfaced to one of the two ports; this capability is suited for DEC users who want to use the Bulk Semi as shared peripheral storage between the host minicomputer and an array processor or data acquisition systems.

Processors from CSP, Inc. and Floating Point Systems, Inc. have already been interfaced to initial dual-port Bulk Semi systems. CSP now offers an interface board as a standard product which plugs into the unit, providing the interface for the Bulk Semi port which can then service the CSP array processor. Dataram offers a range of universal logic cards which provide space for up to 200 integrated circuits for users to generate their own wire-wrap interfaces for custom interfaces on one of the two ports.

Dataram's 512K-byte Bulk Semi Array (BSA) board provides the basic storage capability in the dual-port system. Up to 16 BSAs can be packaged in the system, providing a maximum storage capacity of 8M bytes. Error correcting and error log display are standard.

Typical dual-port Bulk Semi systems cost \$20,000, \$33,000, \$54,000 and \$93,000 for capacities of 1M, 2M, 4M and 8M bytes, respectively. The firm is at Princeton-Hightstown Road, Cranbury, N.J. 08512.



Distributed Logic Corp.

ANAHEIM, Calif. — Distributed Logic Corp. will exhibit in Booth 3110 its quad-size intelligent magnetic tape coupler, compatible with the Digital Equipment Corp. LSI-11 MPU.

Designated the Model DQ130, the coupler links up to two formatted tape drives, with three slave units each, for a total of eight drives from the LSI-11 Q-bus slot.

The coupler interfaces with 800 bit/in. NRZI, 1,600 bit/in. phase-encoded (PE) or dual NRZI/PE formatted tape transports with speed ranges from 12.5 to 125 in./sec.

Data transfers are via the direct memory access (DMA) at rates up to 200,000 char./sec.

Priced at \$1,695, the Model DQ130 features the built-in DMA channel, buffer of data and status transfers between units, generation of formatter start, stop rewind, IRG gap and EOF gap signals.

Distributed Logic is at 12800-G Garden Grove Blvd., Garden Grove, Calif. 92643.

Memorex Corp.

ANAHEIM, Calif. — Memorex Corp., at Booth 2363, will be showing its models 102 and 201 8-in. rigid disk drives offering 23.4M and 25M bytes of storage capacity, respectively.

The Memorex 102 is a double-capacity version of the 101, introduced at last year's NCC in New York. This doubling was reportedly achieved by adding another pair of disk platters to the 101's two-disk configuration.

The 201 incorporates a 12.5M-byte fixed disk and the 12.5M-byte Memorex 2001 removable disk cartridge, which provides the drive with its own backup and allows the total device to serve as a backup for other units, a spokesman explained.

Shipments of the 102 and 201 are slated for the first half of 1981, Memorex noted from San Tomas at Central Expressway, Santa Clara, Calif. 95052.

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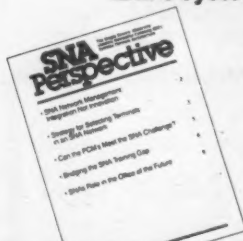
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Mini Peripherals at NCC

Plessey Peripheral Systems

ANAHEIM, Calif. — Plessey Peripheral Systems will exhibit a number of Digital Equipment Corp.-compatible products at Booths 3116 through 3122, including a CRT terminal and an add-in memory for DEC's PDP-11.

The PT-100 CRT terminal was designed as an alternative to DEC's VT-100. Its standard features include a full-screen display of 80 or 132 col by 24 lines, reverse video, blink fields on a per-character basis and variable in-

tensity from bold to half-bright.

All the operational features are keyboard-selectable and can be saved, altered or reset to the initial fixed status, a Plessey spokesman said.

The Irvine, Calif.-based firm will also show its System 13V, a general-purpose microcomputer for small system applications. Supplied with 5M, 10M or 27M bytes of disk cartridge storage, the unit is based on DEC's LSI-11/23 processor, which uses the

PDP-11/34 instruction set.

The System 13V features 256K bytes of addressable memory, a four-level interrupt protocol, parity check and optional floating point. It is reportedly three to five times faster than previous LSI-11-based systems.

The PM-S11E/2A is a 128K-byte dynamic MOS memory that will be shown by Plessey. It operates with 7850-type parity logic in the PDP-11 and is compatible with DEC operating

systems and diagnostics.

The memory has an error checking and correcting feature and utilizes an error-logging register that stores single, double or multiple errors occurring during memory access. Integral LED indicators visually display error conditions.

Other add-in memories that will be displayed by the company include the PM-S11L and the PM-S11/F, both 256K-byte MOS devices. The boards can be used in place of DEC's MS11L.

Another product that will be spotlighted by Plessey is a storage module disk (SMD) controller built for use with Control Data Corp. 9762 and equivalent storage module drives. The PM-DC1102 can handle up to four drives and replaces DEC's RH11 controller and the control logic of DEC's RM02 drives. The controller can accommodate 269M bytes maximum.

The microprocessor-based controller emulates DEC's RH11/RM02 disk subsystem, plugs into any Unibus slot and features a microprocessor-controlled throttle, internal self-test and a dual-port operation.

Another product that will be highlighted in Plessey's booth is a dual-density floppy disk subsystem for the LSI-11 microcomputer. The 1M-byte PM-XSV21 incorporates the firm's PM-XCV21 controller and replaces DEC's RXV21/RX02 system.

At the same time, Plessey will demonstrate an RL02-compatible disk cartridge subsystem for the LSI-11 that supports two drives and has a maximum system capacity of 41.6M bytes, along with a tape cartridge subsystem for Winchester disk backup in an LSI-11 environment.

Finally, Plessey will showcase its PM-FS11/33 Winchester disk subsystem for DEC's PDP-11 series. Consisting of a controller board and a 25.3M-byte disk drive, the subsystem combines a standard SMD interface with Winchester technology.

Plessey is headquartered at 17466 Daimler Ave., Irvine, Calif., 92714.

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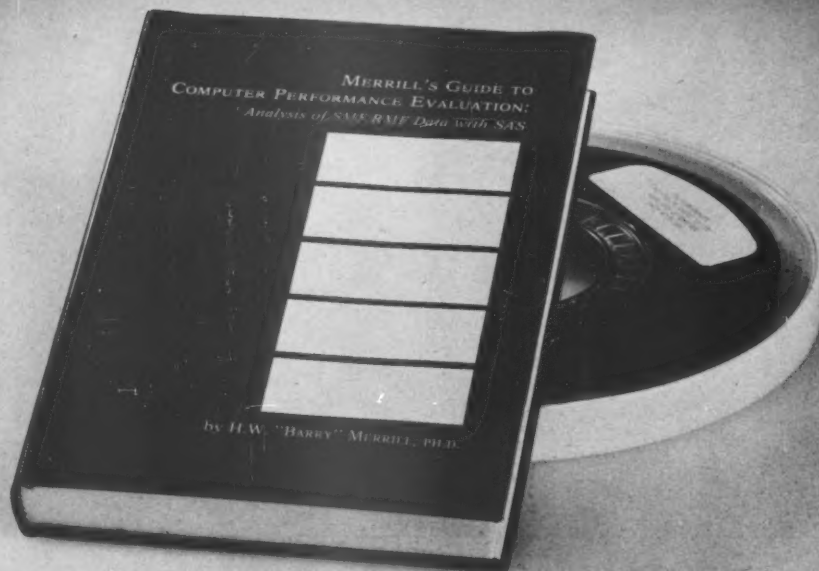
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Tab Products Co.

ANAHEIM, Calif. — Tab Products Co. will feature its diskette products as well as the Model 701 single keystation with Binary Synchronous Communications in Booth 1207.

The 701 handles IBM batch protocols: 2770, 2780, 3780 and 3741, the firm said.

Also on display will be a 701 with a 9-track tape converter and auto-loading diskette pooler, a 702 with a 9-track tape converter and auto-loading diskette pooler; a 702 dual keystation with 2,400- and 4,800 bit/sec modems and a 200 char./sec printer.

Tab Products Co. is at 1451 California Ave., Palo Alto, Calif. 94304.

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PERKIN-ELMER

Mini Peripherals at NCC

Western Peripherals

ANAHEIM, Calif. — Along with a variety of formerly introduced products, Wespercorp's Western Peripherals Division at Booths 3207 through 3211 will spotlight a data cartridge magnetic tape controller designed for Digital Equipment Corp. PDP-11 minicomputers.

The TC-180 is a direct memory access controller that al-

lows the user to utilize 3M Co.-type data cartridges. The controller is transparent to DEC's operating system because it emulates DEC's TM-11/TU-10 magnetic tape devices, the vendor said.

Formatting Function

The controller incorporates a built-in trimode formatting function that permits the user

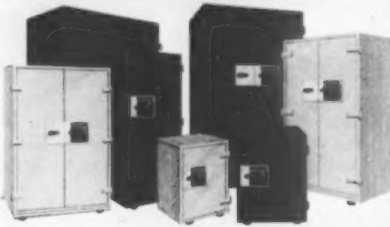
to select the drive type and format best suited to an application, a spokesman added.

Data is written to the media on four tracks in serial mode, one track at a time. The controller interfaces cartridge drives with densities from 1,600- to 6,400 bit/in.

The two-card controller was designed to mount in any two adjacent board slots. It connects with the cartridge drive via two ribbon cables through the computer.

Wespercorp's Western Peripherals Division is located at 14321 Myford Road, Tustin, Calif. 92680.

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Centronics Data Computer Corp.

ANAHEIM, Calif. — Along with its other products in Booth 1548, Centronics Data Computer Corp. will demonstrate a dot matrix printer for small business systems that produces correspondence-quality printing for text and data processing.

The Model 737 features right margin justification, proportional spacing, forward and reverse paper motion and three-way paper handling, the vendor said. The unit prints 7 by 8 dot matrix characters at 10- and 16.5 char./in. for standard DP operations and generates proportionally spaced characters for text processing functions.

An adjustable nine-wire free-flight print head prints "true" lower case, descending characters and underlines.

An optional acoustically padded top is available for the 737 for office installations. The printer costs \$995. The firm is in Hudson, N.H. 03051.

Priam Corp.

ANAHEIM, Calif. — Two recently announced Priam Corp. 8-in. rigid disk drives, with 20M- and 34M-byte capacities, will be displayed in Booths 347 and 349 at the Personal Computing Festival here.

Based on the same design



The Diskos Disk Drive

and using the same interface as the vendor's 14-in. disk drives, the Diskos 2050 and 3450 employ a fully serviced voice coil positioner and a brushless dc motor. Data separation and MFM encoding/decoding circuits are onboard the drives, which means a single low-cost controller can be used for Priam Winchester disk drives having capacities from 20M- to 154M bytes, the vendor said.

Two 8-in. disks are used in the 2050 and three are used in the 3450. Succeeding versions of these drives will have capacities of 40M- and 68M bytes in the same floppy-sized package, by doubling track density.

The brushless dc spindle motor is dynamically braked to minimize head/disk rubbing contact during start/stop, eliminating the mechanical brake required in Winchester disk drives with ac motors. It

also permits the same unit to be shipped worldwide and be used in systems requiring all-dc power. Fast access is provided by the linear voice coil head positioner, the vendor said. Average access time is 50 msec, and track-to-track access is 10 msec including head settling. Average latency is reportedly 6.4 msec.

Unlike open-loop stepper motor actuators, the closed-loop operation of the voice coil ensures continuous on-track positioning of the read/write heads over wide thermal variations, Priam continued. Should a shock to the drive cause the heads to start moving off track, the write gate is immediately inhibited.

Priam's linear positioner permits the Diskos 2050 and 3450 to fit into a length of 14.25 in., exactly the length of a standard 8-in. floppy disk drive.

Height of the units is 4.62 in. and width is 8.55 in., and each weighs less than 20 lbs. Mounting hole locations are the same as for standard floppy disk drives.

In OEM quantities, the Diskos 2050 sells for \$1,800 and the Diskos 3450 for \$2,250. Shipments of evaluation units will begin in the second quarter of 1980, and production will begin in the third quarter, Priam said from 3096 Orchard Drive, San Jose, Calif. 95134.

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Mini Peripherals at NCC

Facit, Inc.



ANAHEIM, Calif. — Two printers and a tape reader/punch will be introduced by Facit, Inc. at Booth 2321.

The Facit 4520 is a bidirectional printer with speeds up to 100 char./sec. The unit is microprocessor-controlled, has a 9 by 9 matrix printing format and accommodates paper roll or fanfold forms.

The printer costs less than \$1,000 with either a serial or industry-standard parallel interface.

The Facit 4542 printer has a full graphics capability and offers microstep control of the firm's 9 by 9 stored-force flex hammer head. The device features two-color printout, gray

scale and proportional spacing, which is said to increase the throughput to more than 250 char./sec.

The printer handles a wide range of character sets, includ-

ing all European versions, Katakana and Libris, and sells for less than \$4,000.

The debuting tape reader/punch, the 4042, is a tabletop unit based on Facit's earlier

4030 reader and 4070 tape punch. The combination device will sell for about \$2,500.

Facit is located at 66 Field Point Road, Greenwich, Conn. 06830.

Diva, Inc.

ANAHEIM, Calif. — At Booth 4313, Diva, Inc. will demonstrate a 600M-byte disk drive that boosts the storage capacity of its Comptroller V disk subsystem to 5.2G bytes.

The 600M-byte disk drive can be used with Digital Equipment Corp. PDP-11 and, PDP-11/70 and Perkin-Elmer Corp. 32-bit minicomputer systems and is available in Winchester-type fixed or removable media models.

When it is implemented with the Comptroller V subsystem, data can reportedly be transferred to the disk at rates up to 1,209K byte/sec.

The Comptroller V can control up to eight drives of different sizes and transfer rates. A multiprocessor allows up to four processors to communicate with the data base.

Diva is at 607 Industrial Way W., Eatontown, N.J. 07724.

Cipher Data Products, Inc.

ANAHEIM, Calif. — Streaming tape drives will be the focus of attention at Cipher Data Products, Inc. in Booth 1729-35 here.

The Microstreamer will be displayed along with Cipher's 900 series vacuum column magnetic tape drives and its line of compliance arm tape drives.

The exhibit is part of Cipher's program to sell users on the advantages of .5-in. magnetic tape as a Winchester disk backup medium.

Cipher is at 10225 Willow Creek Road, San Diego, Calif. 92131.



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MEMOREX Computer Media Products

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Mini Peripherals at NCC

C. Itoh Electronics, Inc.

ANAHEIM, Calif. — Two floppy disk drives and a number of printers will be on display at C. Itoh Electronics, Inc.'s Booth 4207. Targeted for the OEM mar-

ket, the double-sided, double-density disk drives are available in either an 8-in. or 5.25-in. diskette size. They are said to meet all industry-standard interface require-

ments.

The major feature of the 8-in. Maxi-Flexi drive is a steel belt drive system that reportedly reduces access time to the adjacent track to 3 msec. The drive has a single-sided capacity of 3.2M bit/disk and a double-sided, double-density capacity of 12.8M bit/disk.

Data transfer rates are 250K bit/sec and 500K bit/sec, respectively, a spokesman noted.

The smaller Mini-Flexi has a single-sided capacity of 875K bits and a double-sided data capacity of 3.5M bits, he continued. Its data transfer rates are 125K bit/sec and 250K bit/sec, respectively.

Both units feature a mechanism that makes it impossible to close the drive's door unless the diskette is fully inserted. The drives also incorporate a

spindle offset mechanism that prevents reverse loading and an automatic eject device to facilitate diskette removal.

The drives are geared to be used as external memories for terminals, word processors, personal computers and point-of-sale terminals.

C. Itoh will also show at its booth two dot matrix printers that are aimed at OEMs and systems integrators. The 80-col. Comet comes with four character sizes while its companion model, the Comet II, is a 136-col version with two character sizes. The Comet I offers switch-selectable single- and bidirectional printing and can handle forms up to 10 in. wide. It prints at 125 char./sec and has a 63 line/min throughput in its bidirectional mode. A single-direction, printing-only model is also available.

The Comet II prints at 125 char./sec and 40 line/min in its bidirectional mode and handles forms up to 15.5 in. wide. Character spacing is either 10- or 5 char./in. in its double-width mode.

They interface to computers via parallel or RS-232C interfaces.

Finally, the firm will show two daisy-wheel printers that are compatible with sheet feeders and can accommodate paper widths up to 15 in.

The Starwriter and Starwriter II operate at speeds of 25 char./sec and 45 char./sec, respectively, although the former can be upgraded to the latter's speed.

Like the dot matrix printers, the daisy-wheel models utilize either a parallel or RS-232C interface, the vendor said from 5301 Beethoven St., Los Angeles, Calif. 90066.

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CROWN

ANAHEIM, Calif. — Production models of BASF Systems' 8-in. fixed disk and

Aviv Corp.

ANAHEIM, Calif. — A series of magnetic tape controllers for Digital Equipment Corp. PDP-11 and VAX-11/780 minicomputers will be unveiled by Aviv Corp. at Booths 503 and 505.

The controllers occupy a single slot in the host computer, which is reportedly a quarter of the space required by conventional prewired units.

Aviv will also introduce double- and triple-density versions of a high-speed, high-density group code recording (GCR) format tape system for DEC and Data General Corp. computers. The tape systems incorporate Storage Technology Corp. or Tel-ex Computer Products, Inc. drives that operate at 75- or 125 in./sec.

Aviv is based at 6 Cummings Park, Woburn, Mass. 01801.



BASF Systems

minifloppy disk drives will be the main attraction at Booth 2707.

The 24M-byte Model 6172 fixed disk drive with a storage module device (SMD) interface, which has been shipping since late last year, is available with BASF host bus or the firm's disk bus interface. The 8M-byte Model 6171 fixed disk drive is offered with the same variety of interfaces.

BASF will also use NCC to spotlight its 5.25-in. floppy disk drives, the 6106 single-sided unit and the 6108 double-sided version.

Only two-thirds the size of the industry standard, the drives offer a full 40-track access time of 12 msec, which is more than three times faster than similar drives, the vendor claimed from Crosby Drive, Bedford, Mass. 01730.

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Mini Peripherals at NCC

Remex Division of Ex-Cell-O Corp.

ANAHEIM, Calif. — At Booths 3001 through 3007, Ex-Cell-O Corp.'s Remex Division will demonstrate a dual-head diskette drive subsystem that it said has an intelligent, IBM-compatible, double-density controller/formatter on the same board as the drive's electronics.

The Remex RFS 4800 diskette drive subsystem incorporates an interface that is organized around an 8-bit bi-

track "00" in a like manner on both sides of the diskette, the spokesman explained.

For the user that wants to employ double-density encoding but has an investment in single-density operations, the system has a 128-byte, 46-sector format, he added.

The maximum diskette capacity in IBM-compatible double-density encoding is more than 1.2M bytes. For

additional data storage, up to three drives can be daisy-chained to the Remex RFS 4800 in a master/slave configuration.

The subsystem's controller implements a number of functions, including multiple sector transfers, automatic density switching, automatic copy, automatic formatting and a simplified bootstrap.

Finally, the subsystem employs a high-speed band positioner for 3 msec

track-to-track access and an internal buffer between the host and the system that can be 128, 256, 512 or 1K bytes, according to format. The unit can transfer data at the rate of one byte every 16 msec in a nonbuffered setup, the spokesman claimed.

The price of the RFS 4800 is \$830 in OEM quantities; slave drives cost \$489 each in OEM quantity, Remex said from P.O. Box C-19533, 1733 Alton St., Irvine, Calif. 92713.



Remex RFS 4800

directional data bus to facilitate systems integration. The hardware for the system is the RFD 4000 dual-head flexible disk drive, which has a head referencing design, a circuit on the loading solenoid to control head delivery and an improved band-positioning mechanism, a spokesman said.

An on-board, microprocessor-based IBM 6800 controller makes it possible to read and write data on both sides of an 8-in. double density or equivalent diskette in eight double-density and five single-density formats. Six of the formats are said to be standard IBM single- and double-density schemes of 26-, 15- and 8 sector/track. Three other double-density formats facilitate software generation by formatting

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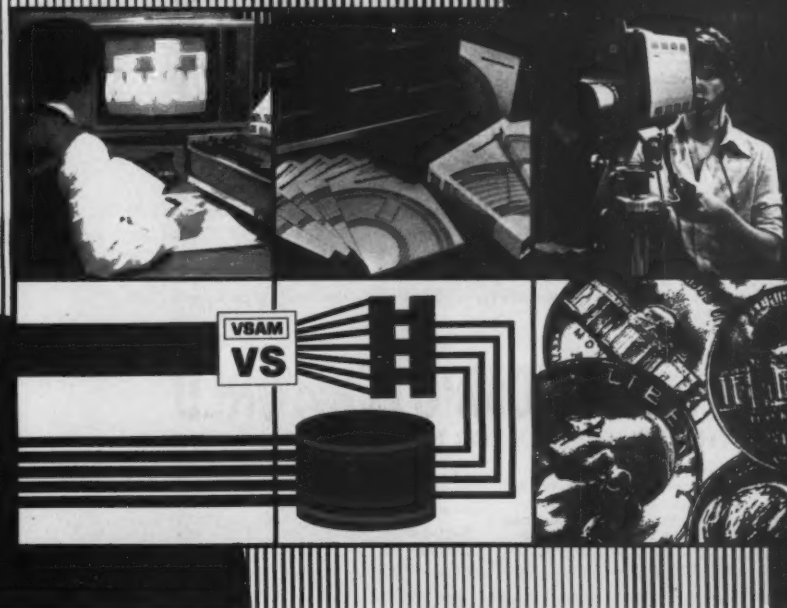
Datasystems

ANAHEIM, Calif. — Datasystems will show four line printer controllers, including one with self-test, for Digital Equipment Corp. and Data General Corp. computers or equivalents at Booth 3314.

Operating with all printers incorporating Centronics Data Computer Corp. and/or Dataproducts Corp. interfaces, the controllers are hardware- and software-compatible with all DEC PDP-11, VAX-11/780 and LSI-11 processors as well as all DG Nova and Eclipse processors, Datasystems said.

For DG computers, Datasystems manufactures both a programmed I/O and a data channel interface.

Datasystems is at 8716 Production Ave., San Diego, Calif. 92121.



Power Supplies at NCC



Topaz Electronics Division

ANAHEIM, Calif. — Topaz Electronics Division will exhibit its line of uninterruptible power systems (UPS), power conditioners and line noise suppression equipment in Booths 1243 and 1245.

The 81000 UPS series has a power range of 3kVA through 15kVA for both the 60Hz and 50Hz models. Standard features include an audible alarm and acknowledgment switch and a bat-

tery ammeter and output frequency meter.

The rack-mount 500- to 1,500VA 82000 series is single-phase. The input ac voltage can vary from 105- to 130Vac. If operating with direct current, there is a 63- to 82Vdc range. A mimic bus, transfer switch and alarm relay contacts are standard equipment for this model.

Among the power conditioners on

display will be a .8- to 2kVA portable model. A 1-cycle maximum response time and "less than 2%" total harmonic output distortion are claimed for the Line 2 conditioners.

The company will also exhibit its Series 30 ultraisolators, which are geared toward computer applications where severe power line noise can create errors and system shutdowns. Power ratings are 125VA to 20kVA for the single-phase model and 3- to 130kVA for the three-phase equipment.

The 81000 UPS costs between \$7,855 and \$23,160, depending upon the power and voltage requirements. Line 2 power conditioners are priced from \$505 to \$2,690 and the Series 30 noise suppression equipment price ranges from \$215 for a 125VA single-phase model to \$14,360 for the 130kVA three-phase product.

Topaz Electronics is at 3855 Ruffin Road, San Diego, Calif. 92123.

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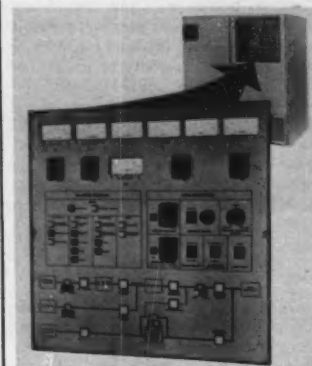
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Sola Electric

ANAHEIM, Calif. — An expanded line of uninterruptible power source (UPS) systems, utilizing 12-step pulse-width modulation and featuring new operator control panels, will be featured by Sola Electric in Booths 4422 through 4426.

The 12-step UPS systems are intended for use with large mainframes, industrial process control and other large-scale electronic equipment.

The expanded operator control panel, which will be operational at the show, offers an array of meters, status indicators and alarms for system monitoring and control, the company said.



Sola 12-Step UPS

Status indicators are arranged in a "mimic bus" layout to provide a visual representation of the system's power flow for performance monitoring at a glance.

Also slated to be shown are Sola's Mini-UPS system, designed for use with small electronic devices and the Sola microcomputer/minicomputer regulator.

Sola, a unit of General Signal, is located at 1717 Busse Road, Elk Grove Village, Ill. 60007.

Power Supplies at NCC

Franklin Electric

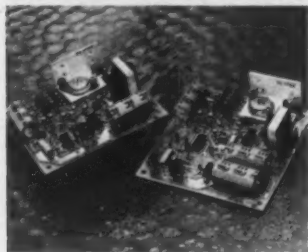
ANAHEIM, Calif. — Two solid-state 415 Hz frequency converter/uninterruptible power systems (UPS) will be introduced in Booths 3215 and 3217 by the Programmed Power Division of Franklin Electric. Called High-Links, these systems can save a customer \$10,000 to \$25,000 in battery costs by using the same battery bank normally provided for one large 60 Hz UPS, the company claimed.

The High-Link 475H and 4125H, rated at 75 and 125 kVA respectively, have a dc terminal voltage of 395V to 425V. They convert raw 50/60 Hz power into the regulated 415 Hz power required by processors like the IBM 30 series and 370/168, the Amdahl Corp. 470V/5,6,7 and 8 and mainframes from Univac, Control Data Corp. and others.

Boschert, Inc.

ANAHEIM, Calif. — Boschert, Inc. will display its switching power supplies at Booths 2659 and 2661.

On display will be Boschert's Series



3-Terminal Regulators

XL130 open-frame switching power supplies; Series XL75, a power supply that offers four 3% or better regulated outputs on a terminal block; and Series XL25, a 25W multiple-output switching supply which is said to be competitive with similar linear products.

Also on display will be the firm's 3-Terminal Regulators, design modules that are said to provide a single adjustable regulated output from a raw positive dc source, the firm said from 384 Santa Trinita, Sunnyvale, Calif. 94086.

Elgar Corp.

ANAHEIM, Calif. — Elgar Corp. will introduce and show the first of its medium-range Pulse Width-Modulated Uninterruptible Power Systems in Booths 1856 through 1858.

The unit, which is available in rating from 10- to 50 kVA, will appear along with Elgar's line of ac line conditioners, high-isolation transformers, ac power sources and frequency converters, the firm said.

Elgar Corp., a subsidiary of Onan Corp. of Minneapolis, is located at 8225 Mercury Court, San Diego, Calif. 92111.

The High-Link UPS features roll-out heat sink panels. They have a 91% efficiency at full load and a mean time between failures of 15,000 hours, or 100,000 hours in redundant operation, the vendor said.

The approximate price of these two units is \$40,000 for the 475H and \$48,000 for the 4125H.

The Programmed Power Division of Franklin Electric is headquartered at 995 Benicia Ave., Sunnyvale, Calif. 94086.

Lortec Power Systems, Inc.

ANAHEIM, Calif. — The three-phase uninterruptible power systems (UPS) from Lortec Power Systems, Inc. will again be on display in Booths 318 and 320.

Lortec has reduced the floor space requirements by "up to 30%" of most of its systems this year and maintains that this will result in lower installation costs.

Various models' power ratings are from 15- to 150-kW with a standard frequency of 60 Hz. Battery voltage is between 120- and 250Vdc and varies

with the power rating. A maintenance bypass switch, system mimic bus/control panel, remote alarm status panel and automatic transfer switch are some of the standard features.

Available options include 50Hz frequency, air temperature sensors and an external battery disconnect switch, cabling and conduit.

Lortec Power Systems, Inc. is headquartered at 5214 Mills Industrial Parkway, North Ridgeville, Ohio 44035.

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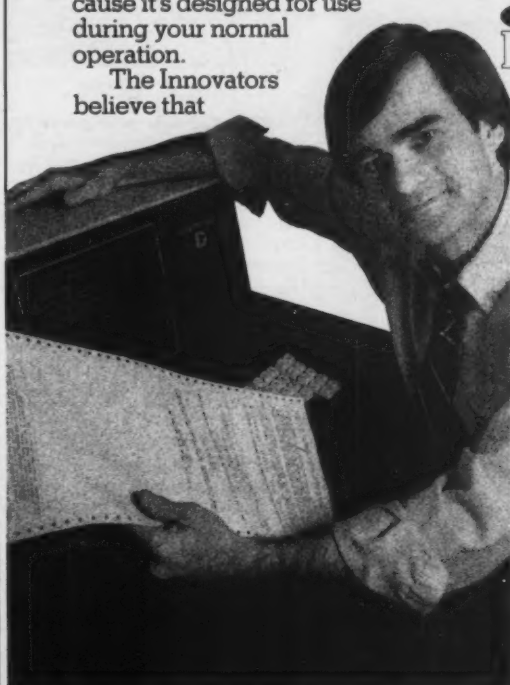
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... And Other Things to See

Emergency Power Engineering, Inc.

ANAHEIM, Calif. — Emergency Power Engineering, Inc. will show its Powerbloc computer protection system in Booths 3308 through 3310.

The self-contained system was designed to protect against power transients and provide backup protection of power outages up to 500 msec.

It also offers total brownout protection with a regulated output of 1% with msec response, the company said.

Powerbloc is available in units rated 30- to 50-kVA. Emergency Power, Inc. is at 3595 Cadillac Ave., Costa Mesa, Calif. 92626.



Dranetz Engineering Labs

ANAHEIM, Calif. — Dranetz Engineering Laboratories, Inc. will feature its Series 606 power line disturbance analyzers in Booth 1820.

The Series 606 is a microprocessor-based portable instrument designed to

D-584 and D-586, priced at \$5,900, \$7,700, \$9,800 and \$11,900 respectively.

Also slated to be shown are the firm's other products for network management, diagnostics and modem-related applications.

Spectron is at 344 New Albany Road, P.O. Box 620, Moorestown, N.J. 08057.



Disturbance Analyzer

monitor a wide range of power line disturbances, the company said. It measures three voltage inputs for sags, surges, slow average RMS changes and impulses.

The unit is capable of continuous unattended operation and can store, analyze and classify quantitative data. It also provides an alphanumeric tape printout for a permanent record.

Dranetz is located at 2385 S. Clinton Ave., S. Plainfield, N.J. 07080.

Floating Point Systems, Inc.

ANAHEIM, Calif. — Floating Point Systems, Inc. (FPS), a manufacturer of array processors, will premier its FPS-164 attached processor at booth 2452.

The FPS-164 is a high-precision attached processor providing a computational throughput of 12 million floating-point operations the vendor said.

Its precision exceeds 15 decimal digits through 64-bit floating-point arithmetic. Its architecture features internally synchronous operation through multiple independent parallel data paths, separate memory and pipelined arithmetic units.

The processor is attached to a host computer input/output channel or DMA channel by a hardware and software interface. The host processor could be a supermini such as Digital Equipment Corp.'s VAX-11/780, a mid-size mainframe such as IBM's 4341 or a large mainframe like IBM's 3033, the vendor noted.

Interface to the VAX-11/780 is through a DR-780 SBI adapter, and interface to the IBM systems is on a block multiplexor channel, FPS said.

The FPS-164 was designed for use in applications demanding high computer throughput and extended precision. FPS can be reached at P.O. Box 23489, Portland, Ore. 97223.

Spectron Corp.

ANAHEIM, Calif. — Spectron Corp.'s D-580 series of Datascope line monitors and interactive analyzers will be featured in Booth 235 here.

The D-580 series provides bit-level handling, high-speed monitoring, simplified setup and operation, block check character generation and checking, character trapping, Bert testing and idle suppression on data storage, the company said.

The D-580 series of Datascope includes four models: the D-580, D-582,

... And Other Things to See

Dennison Kybe Corp.

ANAHEIM, Calif. — Two products for maintaining and evaluating tapes will be displayed for the first time in Booths 1404 through 1406 by Dennison Kybe Corp.

The Kybe 8500 is a tape maintenance

Mini-Computer Systems, Inc.

ANAHEIM, Calif. — Mini-Computer Systems, Inc. will exhibit its Micos business computers, peripheral controllers and Deskware here in Booth 2602.

Product introductions at NCC will include a small business computer system, additions to the Micaps family of accounting packages and a Data General Corp. Nova-embedded storage module drive disk controller.

Micos systems on display will include the Micos 75 and 85 business systems. An entry-level Micos 75 basic system includes a 64K-byte CPU, CRT, 10M bytes of hard disk storage, printers, cabinetry and Micos operating system for \$26,600.

The Micos 85 provides 32M or 64M bytes of on-line disk storage starting at \$35,500. Micos systems expand to a dual-processor Micos 300 with 24 operator workstations and 1G of on-line disk storage.

The MCS Peripheral Products Division will display various multiplexers, printer and disk controllers and the company's line of Deskware computer furniture.

Mini-Computer Systems is at 399 Fairview Park Drive, Elmsford, N.Y. 10523.

system capable of cleaning, retensioning, removing static charge and testing a 2,400-ft reel in 9-channel 1,600 bit/in. and 6,250 bit/in. formats in four minutes.

The system counts and charts one-, two-, and three-track dropouts computer correlated at low, nominal or critical levels, so users can tell which tapes are safe for critical runs, which should be stripped and which should be discarded. It is priced at \$9,995.

A tape cleaner/damage detector, as yet unnamed, will clean, retension and remove static charge from 2,400-ft reels in approximately three minutes. With options, the system will detect oxide voids and other tape defects that could lead to errors or aborts. Unlike a full-blown tester, it evaluates live data tapes without erasing stored information. It will be priced from \$4,300.

Dennison Kybe is at 132 Calvary st., Waltham, Mass. 02154.



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... And Other Things to See

Integral Data Systems, Inc.

ANAHEIM, Calif. — At Booths 1724 through 1726, Integral Data Systems, Inc. will demonstrate its Paper Tiger line of printers, including a desktop matrix model that produces letter-quality copy at speeds of 160 char./sec.

The Model 460 was designed

for high-volume text and DP applications and employs a dot matrix character formation technique in which the placement of dots overlap both horizontally and vertically to create correspondence-quality printing. This feature also gives the printer

the ability to produce high-resolution graphics, a spokesman said.

The unit's nine-wire "ballistic" print head has staggered needle rows and is driven bidirectionally under microprocessor control by a stepper motor drive mechanism with a logic-seeking look-ahead capability and a high-speed slew from the end of one line to the beginning of the next, he explained.

The printer's control functions include proportional spacing, enhanced text printing and a variety of standard print densities. Other selectable print features are automatic text justification, pro-

grammable horizontal and vertical tabbing, reverse paper feed and "fine positioning" of characters.

The model 460 can print in 80-, 96- and 132-col formats. In addition, foreign or custom character sets can be optionally added to or replace the unit's standard Ascii 96-char. set, which allows upper and lower case characters with descenders.

In addition to controlling print functions, the machine's microprocessor provides two levels of diagnostics. An automatic test verifies the integrity of the printer's memory and electronics each time the power is turned on. The 460

has a standard 2K-byte buffer, enough to fit the contents of an entire CRT screen, and a Dotplot graphics feature that enables the unit to print such things as bar codes, block letters and illustrations.

The printer has an RS-232C serial interface as well as a Centronics Data Computer Corp.-compatible interface and switch-selectable transmission rates ranging from 110- to 9,600 bit/sec.

Deliveries of the Paper Tiger 460 are scheduled for next month. The unit sells for about \$1,295 in OEM quantities, Integral Data Systems said from 14 Tech Circle, Natick, Mass. 01760.

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Quest Automation, Ltd.

ANAHEIM, Calif. — A data entry terminal that accepts hand printing will be displayed by the British firm Quest Automation Ltd. in Booth 4001.

In what is called the first U.S. showing of the product, Micropad will be demonstrated capturing handwritten data from either remote or local terminals. The unit recognizes ordinary hand printing and translates alpha, numeric and special characters directly into machine-readable form, the firm said.

The unit incorporates both the RS-232C and the 20mA current loop interfaces, the

company said, adding that all character recognition takes place in the Micropad and that all that is transmitted to the computer is Ascii character plus its position on the document.

Presently the unit is marketed by Micropad Ltd., part of the Quest group of companies. However, Quest is seek-

ing OEM arrangements with U.S. firms and a U.S. subsidiary of Micropad Ltd. is being formed to service the U.S. market. The expected end-user price will be around \$3,500 per unit, the firm said.

Quest is located at Quest House, Princes Road, Fern-down, Dorset, BH22 9HQ, UK.

Datacomm Service Corp.

ANAHEIM, Calif. — Network planning and communications service offerings from Datacomm Service Corp. will be shown at Booth 1139.

Datacomm, a subsidiary of General Datacomm Industries, Inc., supports its parent company with on-site and emergency maintenance, installations, modifications and removal services. It further manages systems operation as well as classroom and laboratory training.

The firm offers three levels of service depending on customer need, extended coverage up to seven days a week, 24 hours a day, and an average response time of four hours.

Datacomm Service Corp. is at 1 Kennedy Ave., Danbury, Conn. 06810.

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... And Other Things to See

Nortronics Co., Inc.

ANAHEIM, Calif. — Three developments in magnetic head technology — two of which reportedly offer fourfold increases in tape storage capacity — will be put on display for the first time by Nortronics Co., Inc. at Booth 1343.

The newest of the three products, as yet to be announced, is what Nortronics' officials describe as an "innovative double-sided floppy disk head," for which a patent has been applied.

The two previously announced heads to be displayed at the conference are the 16-channel, positionable head for disk backup systems, capable of use in systems employing the three sizes of standard data cartridges — .15-in., .25-in. and 8mm tape width; and the 18-channel permalloy .5-in.-tape drive head, with Nortronics' LTC ceramic coating, which offers four times the storage capacity of current .5-in. GCR systems.

The positionable head, also called a "streamer" because it records in a serpentine fashion, is a disk backup system capable of storing 100M bytes (unformatted) at 12,000 bit/in. on 16 tracks. The exception is on .15-in. tape, which has insufficient tape capacity to achieve 100M bytes.

The 18-channel permalloy head for .5-in. media increases from nine to 18 the number of tracks on existing, standard .5-in. tapes, while also doubling the linear density. This results in the fourfold increase in storage capacity over conventional systems.

"We will demonstrate separate models of this for the 48 track/in. systems as well as the 100 track/in. systems.

Applied Magnetics Corp.

ANAHEIM, Calif. — A special display of thin-film magnetic head technology — which is just beginning to show up in end-user disk products — will be shown in Booth 1411 by Applied Magnetics Corp.'s Magnetic Head Division.

In addition, the firm will show its 18-track tape heads, streamer tape heads, double-density 3350 heads and double-density, double-sided floppy disk heads.

The firm is at 75 Robin Hill Road, Goleta, Calif. 93017.

These heads also are adaptable to the 8-in. and 5.25-in. double-sided drive systems," the firm said.

Nortronics is at 8101 10th Ave. N., Minneapolis, Minn. 55427.

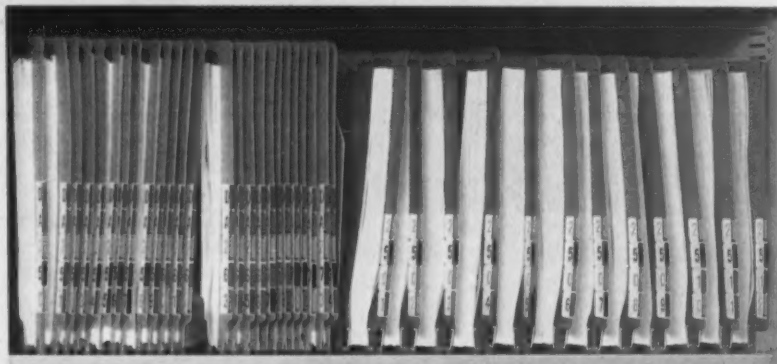


Epson America, Inc.

ANAHEIM, Calif. — Epson America, Inc. will use Booths 2257 through 2263 as a launching pad for an 80-column and a condensed 132-column dot matrix printer aimed at small business and personal computer systems.

The firm will also show its line of alphanumeric LCD modules that have a display capacity of from 16 to 160 char.

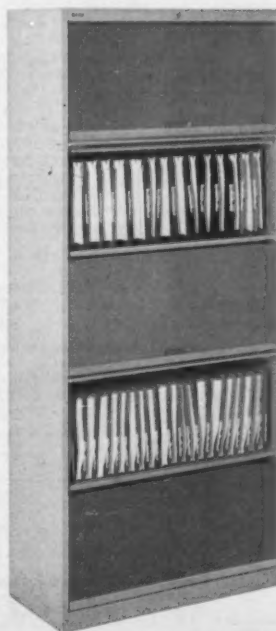
Epson is headquartered at 23844 Hawthorne Blvd., Torrance, Calif. 90505.



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Look For Tab's Computer Accessory
Products At NCC '80 in Booth #1207

... And Other Things to See

Interstate Electronics Corp.

ANAHEIM, Calif. — You can talk to the product in Booth 4027 and it will listen to you.

The product is Interstate Electronics Corp.'s Voice Rec-

ognition module, which is a single printed circuit board containing all the necessary circuitry to convert the spoken word into digital code, according to its developers.

The unit can recognize as many as 100 words or short phrases and uses standard parallel or optional serial interfaces.

The unit has a microphone

preamplifier and a preamplifier bypass switch.

Spectrum Analyzer

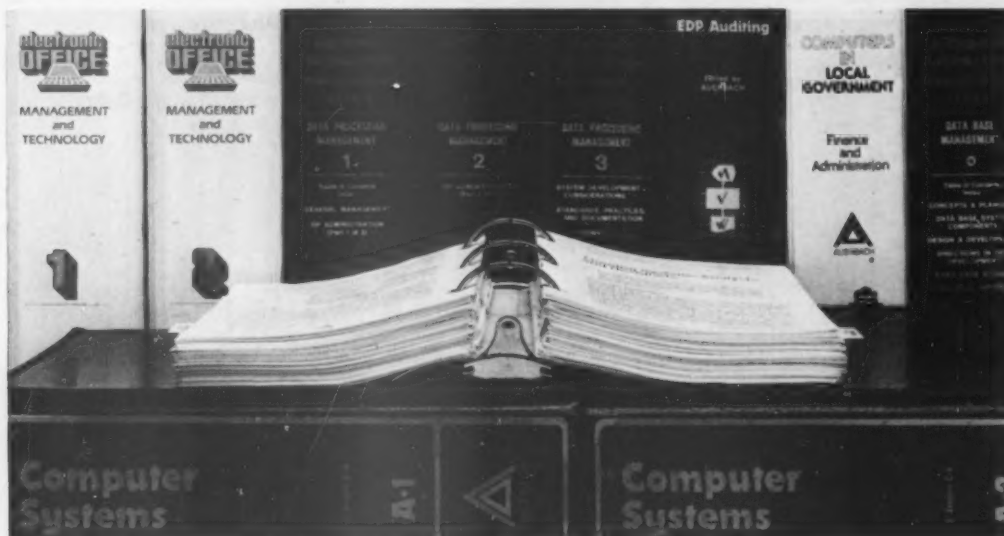
The input speech is analyzed by a 16-filter spectrum analy-

zer and converted to digital representation of the characteristics of the spoken input. This digital data is then converted to a fixed-size pattern that preserves the information content of the spoken inputs while discarding redundant features.

During word training, these patterns are used to derive templates for each vocabulary item, which are then used in the recognition process for comparison with incoming spoken words.

Vocabulary inputs are stored in onboard random-access memory while the processing algorithms are contained in onboard read-only memory.

The unit is available in models ranging from 40 words to 100 words and the firm claims a 99% accuracy rate. Single unit prices range from \$1,350 to \$1,980 and multiple unit discounts are available, the firm said form 1001 E. Ball Road, P.O. Box 3117, Anaheim, Calif. 92803.



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... And Other Things to See

Rusco Electronic Systems

ANAHEIM, Calif. — You may need a security clearance to get into Booths 3009 through 3011.

That's where Rusco Electronic Systems will be showing its Identification Network System that is designed to provide secure access to computer centers and other high-security areas.

The key to the system, according to the firm, is the patented Ruscard, which is identical in size to the standard plastic credit card, but has its own unique identification number encoded on it. There are more than one trillion codes possible, the firm added.

By programming the microaccess (MAC) controller, management is able to determine who has access to which areas or pieces of equipment, and when.

Choice of Controllers

The MAC controller is available in a choice of two models: the MAC 530 controller, with which a company can issue up to 2,000 individual identification cards with memory and I/O facilities sufficient to handle from four to 32 reader/terminals, 16 to 64 cardholder status levels and from 16 to 127 time intervals; or the larger MAC 540

controller, which can handle up to 20,000 cardholder identification numbers and support 256 reader/terminals and 256 status levels.

To gain access to a protected area, an



The Identification Network

employee inserts the Ruscard in the card reader located at the access point. The code is then transmitted back to the controller, which either permits or denies access based on three separate categories of input: personal identification number, time code and status level, which indicates where the cardholder can use his card to gain access.

The firm is at 1840 Victory Blvd., Glendale, Calif. 91201.

Comtal Corp.

ANAHEIM, Calif. — Comtal Corp. will use Booth 2243 to once again enliven the convention floor here with its color graphics systems.

The firm will highlight its Vision One/20 product in a twin display configuration. The system uses a Digital Equipment Corp. LSI-11/02 microcomputer as a system controller for I/O, command language interpretation/execution, graphics overlay control and memory management of up to 48M bytes of on-board dual-ported memory for image storage.

The firmware, programmable read-only memory, or optional software (random-access memory) resident operating system provides for stand-alone or host-driven operation with a

field-upgradable image refresh data base memory.

The images in memory on the system can be displayed in black and white or in color in either 512 by 512 or 1,024 by 1,024 resolution. The available I/O options include host interfaces to most major minicomputers, image transfer to and from the host, commands to the Vision One/20 and downloading user code to the LSI-11.

The unit's Digital Video Input Processor provides for TV image digitizing and compensates for dark current and shading as well as adaptively integrating each pixel to maximize its own signal to noise ratio, the firm said.

Comtal is located at 505 W. Woodbury Road, Altadena, Calif. 91001.

Spatial Data Systems, Inc.

ANAHEIM, Calif. — Image data processing — either gray scale or color — will be the main interest in Spatial Data Systems, Inc.'s Booth 1200.

The Eyecom II picture digitizer and display will be the major product and is capable of displaying alphanumeric, graphics and pictures.

The unit, which performs both input and output for the processing of pictures, uses a vidicon television camera for pictorial input. The unit senses the light emitted by the object to be digitized.

The brightness is then converted into an electrical voltage by repeatedly scanning the image with an exploring

spot formed by the electron beam of the camera tube. This is transmitted through a video amplifier chain to the display where it controls the brightness of a reproducing spot formed by the electron beam.

The unit contains a Digital Equipment Corp. LSI-11-based microprocessor system that is interfaced to the Eyecom through a special controller for stand-alone image processing capability. Controllers for other computers are also available.

The firm can be reached at P.O. Box 249, 508 S. Fairview Ave. Goleta, Calif. 93017.

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... And Other
Things to See
Verbatim Corp.

ANAHEIM, Calif. — Three products, ranging from a personal computer minidisk to an extreme environment disk, will be introduced by Verbatim Corp. at Booths 1228 through 1234.

The personal computer mindisk is actually an improved version of a similar product in the firm's minidisk line. This one features a redesigned jacket that is said to boost media life and reliability. The minidisk comes in several configurations including single- and double-sided units and devices with 35 to 77 tracks per surface.

The company will also be showing a high-density minidisk, the MD 577, which is designed specifically to be used with Micropolis Corp. drives but can be fitted to similar devices. The

single-sided disks have track densities of 48-, 96- and 100 track/in. and feature a hub reinforcing ring that is said to minimize damage caused by misclamping, a spokesman claimed.

Finally, Verbatim will be displaying an 8-in. flexible disk that is reportedly capable of operating and being stored at temperatures up to 160° F. The Optima XE is aimed at military and industrial environments but can also be useful if a user has a habit of storing disks in automobiles or exposing them to direct sunlight, the spokesman added.

Verbatim will also be showing a variety of its other products at the show, he said. The company can be reached at 323 Soquel Way, Sunnyvale, Calif. 94087.

Vu-Data Corp.

ANAHEIM, Calif. — Vu-Data Corp. will show its 25mHz Model 2521 miniscope in Booth 2141.

The 2521 is equipped with an optional multimeter and frequency counter and can automatically read voltage directly from the scope input.

The 3.5-digit meter measures dc and/or ac to 1,000 V full-scale and resistance to 1.999kohms, the company said. If CH1 input to the scope is ac-coupled, the meter reads the rms value of the CH1 signal so the operator need not make the mental calculation of p-

p-to-rms. Range and polarity selection are automatic.

The counter reads to 25mHz and digitally displays the input frequency of either CH1 or CH2. The unit operates from the scope trigger circuit, therefore requiring as little as 2.7mV to trigger, the company said.

The 2521 is priced at \$1,795, and the scope without DMM/Counter costs \$1,395.

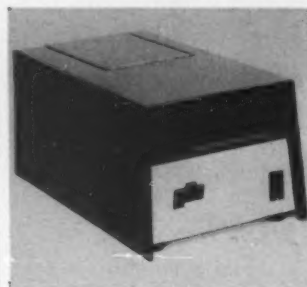
Vu-Data is at 7170 Convoy Court, San Diego, Calif. 92111.

Peripheral Dynamics, Inc.

ANAHEIM, Calif. — Booths 2547 through 2549 will be the site of a display of Peripheral Dynamics, Inc.'s Broad Spectrum sense head, which can

continuously, column by column. The units have the ability to read cards from 22 columns long on up, the firm said.

Peripheral Dynamics, located at 1730 Walton Road, Blue Bell, Pa. 19422, said the units cost \$1,495 in OEM quantities.



The Broad Spectrum

read a range of marking instruments including felt-tip and ball-point pens.

The head is used in the firm's Series 100 mark sense readers, which are expected to find applications in such areas as lotteries, race track betting, voting, census taking, polling and other application area where data is captured from the general public, the firm said.

The Series 100 is basically a remote data collection station, which can accept most card formats and reads data

Afips
Press

ANAHEIM, Calif. — Even the show's sponsor is taking a booth here as Afips Press, the publishing arm of the American Federation of Information Processing Societies (Afips), occupies Booth 1755.

In addition to publishing the conference proceedings from the NCC and other Afips-sponsored shows, the unit produces statistical research reports, educational materials, proceedings of special seminars and a quarterly journal called *The Annals of the History of Computing*.

Afips Press undertakes the production, distribution, editorial and marketing activities involved in these activities. It is headquartered at 1815 N. Lynn St., Arlington, Va. 22209.

... And Other Things to See

Kennedy Co.

ANAHEIM, Calif. — A microprocessor-based formatter will be in the spotlight in Kennedy Co.'s Booth 2115.

The unit, for use with the firm's Model 640 8-in. backup cartridge transport, uses Group Code Recording (GCR) techniques to reduce host computer overhead, the firm said.

The formatter is integral to Kennedy's 6,400 bit/in., four-track, serpentine cartridge drive, which has a 17.3M-byte unformatted capacity, the company added. With 10K-byte records, formatted capacity is 15M bytes on a 450-ft DC300A cartridge.

Major components of the unit include an 8-bit MOS processor and two-speed bipolar microsequencers. The processor handles communications with the host, provides transport control, initiates read/write sequences and monitors the timing structure of commands, the firm said. The formatter writes a hardware-implemented 16-bit cyclic-redundancy check (CRC) character on the tape at the end of each record, and during read operations the formatter calculates the CRC character and compares it with the recorded

check character for data integrity, the firm said.

Since the firm expects that the Model 650 formatter and Model 640 cartridge transport will be used as backup to an 8-in. disk drive, a single direct-memory access controller can be used for both disk drive and cartridge transport, the firm added.

The bus structure consists of eight control lines and eight bidirectional data lines. The control lines have logi-

cal definitions that permit common handshaking signals for disk and cartridge with varying software routines to accommodate data access, speed and timing differences. In single-unit quantities, the Model 640 disk backup cartridge is priced at \$1,200 and the Model 650 formatters are priced at \$400 each. Multiple unit discounts are available, the firm indicated from 1600 S. Shamrock Ave., Monrovia, Calif. 91016.



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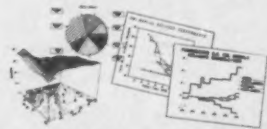
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GNT Automatic, Inc.

ANAHEIM, Calif. — In Booth 2252, GNT Automatic, Inc. will unveil an enhanced microprocessor-based tape punch station for use in punching five-channel Baudot tape for telex networks and EIA RS-244 tape for the numeric control machine tool industry.

The 3601 has a punching speed of 75 char./sec and a mean-time-between-failure of 100 million characters. It is available with both parallel and serial interface for \$1,995 without code conversion or \$2,195 with the code conversion feature.

GNT Automatic is at 1560 Trapelo Road, Waltham, Mass. 02154.

Datapro Research Corp.

ANAHEIM, Calif. — Datapro Research Corp.'s line of reference works will be on display in Booths 1446 through 1448.

The reports cover such things as mainframes and peripherals, software, minicomputers, data communications, DP management methods, office systems, word processing, copiers and duplicators, banking automation and retail automation.

All the references are available under an annual subscription program and can be reviewed for 30 days under the firm's trial subscription program, the firm said from 1805 Underwood Blvd., Delran, N.J. 08075.

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... And Other Things to See

Motorola, Inc.

ANAHEIM, Calif. — Motorola, Inc.'s Display Systems Division will show its M1000/M2000 series of 5-in. and 9-in. CRT screens in Booths 2228 through 2238.

The units are said to offer video response to 12MHz and deliver 650-line horizontal resolution. The firm will also show several versions of its 12-in. CRT models MD3000 and M3570/-M3970 and the 15-in. M4000 and M4408, both of which display more than 6,000 char. in either a vertical or horizontal format.

While the M4000 offers 22MHz bandwidth in a standard CRT format, the M4408 is a full-page raster-scan module designed for systems requiring high character density and/or graphics capability.

The can be ordered with its LM1 Character Generator/Display driver, which is compatible with any microprocessor or CPU on the market, according to Motorola.

The firm is located at 1155 Harvester Road, W. Chicago, Ill. 60185.

Aspen Ribbons, Inc.

ANAHEIM, Calif. — Computer and word processing supplies will be center stage in Booths 3300 and 3302 as Aspen Ribbons, Inc. pushes its free catalog.

Aspen offers many products for sale, either retail or wholesale, including acoustical enclosures, audio and video cassettes, cartridge ribbons for word processors and computer terminals, narrow-width computer ribbons and wide-line computer ribbons.

In addition, lift-off tapes, tables for

CRTs, dictation and phone-answering cassettes, digital cassettes, diskettes — both unformatted and preformatted — and disk packs are also covered in the catalog.

Furthermore, magnetic cards, magnetic tape, paper and toner, print wheels, Selectric elements, sheet feeders and static mats are also among the products offered.

The firm is at 1700 N. 55th St., Boulder, Colo. 80301.

Hitachi America, Ltd.

ANAHEIM, Calif. — Hitachi America, Ltd., Booth 4309, will feature its HM-Series of high-resolution in-line gun monitors. In addition, the firm will make the first public showing of its latest medium-resolution in-line gun color monitor.

The color monitors are said to feature adjustment-free convergence, one PCB configuration, a video amplifier bandwidth from 50Hz to 25MHz and flexible frequencies from 15- to 18kHz horizontal and 50- to 60Hz vertical, the vendor said.

HM-Series models on display will include HM-2719, HM-2713 and HM-1713, the vendor said from 100 California St., San Francisco, Calif. 94111.

Mitsubishi Electric Corp.

ANAHEIM, Calif. — Mitsubishi Electric Corp. will show a pair of 13-in. CRTs for use in terminals at Booths 2017 and 2019.

Standard features include color, shadow mask and precision in-line delta gun with .31mm tridot spacing for high resolution. It is said to offer a 25% savings over comparable units, and it does not require complicated dynamic convergence circuitry normally found in such systems, according to the vendor.

Mitsubishi Electric Corp. is at 3030 E. Victoria St., Compton, Calif. 90221 or at 7045 N. Ridgeway Ave., Lincolnwood, Ill. 60465.

Data Electronics, Inc.

ANAHEIM, Calif. — Streaming digital cartridge disk drives that are said to be custom-tailored for the OEM Winchester disk backup application will be displayed by Data Electronics, Inc. at Booths 2100 and 2102.

Available in 10M- and 20M-byte versions, the drives cost \$746 and \$788, respectively, for OEM vendors.

Data Electronics is at 10150 Sorrento Valley Road, San Diego, Calif. 92121.

SYST-2VX



Plessey's LSI-11/2* Microcomputer and Floppy Based Systems

Series SYST-2VX is Plessey's new high-performance, general purpose microcomputer system designed for small system applications. Based on the LSI-11/2, the SYST-2VX series is an ideal entry-level floppy system with additional backplane slots available for expansion to large data base applications — AND the versatile instruction set of the PDP-11/34 to support the extensive software associated with hard disc storage. When used in conjunction with an optional terminal, the features of the SYST-2VX surpass those of DEC's* non-expandable PDT-11 programmable data terminals.

Plessey's new SYST-2VX microcomputer systems include:

- 64 Kbytes of random access memory (RAM)
- dual density floppy disc subsystem with one or two drives for up to 1 Mbyte of storage
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- line time clock
- bootstrap ROM and terminator
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... And Other Things to See

Industrial Engraving Co.

ANAHEIM, Calif. — Chemically engraved print drums and print bands are the forte of Industrial Engraving Co., and it will be showing off its wares in Booth 3306.

All of the components are custom-made, the firm said, so the price and availability depend on each customer's particular requirements.

However, the firm indicated that its turnaround time was usually 30

days for prototype units.

The firm also claimed that its bands and drums are free from distortion since each alphanumeric character is drafted at 50 times its final size and then reduced with a single-step photographic process. The firm also employs one-bite chemical etching that is said to reduce etch factor to a minimum.

The firm is at 2100 Liberty St., P.O. Box 311, Easton, Pa. 18042.

McGraw-Hill Book Co.

ANAHEIM, Calif. — A range of text and reference books will be exhibited in Booths 1209 through 1217 by McGraw-Hill Book Co.

The firm offers books from the introductory through advanced levels, including programming manuals on such languages as Basic, Fortran, PL/I, PL/C, Cobol, APL, Pascal and RPG.

Other books range from how-to

manuals for using various personal computers to texts on methods of utilizing computers in the business environment, the firm said.

The firm also offers detailed documentation to the SPSS batch system.

The McGraw-Hill Book Co. is located at 1221 Ave. of the Americas, New York, N.Y. 10020.

American Magnetics Corp.

ANAHEIM, Calif. — The Model 44 Magstripe encoder/reader will be unveiled by American Magnetics Corp. in Booth 1101 here.

Previously the firm had specialized in Magstripe card readers, and the Model 44 is the first unit from the company to add a write capability.

The Model 44 will cost approxi-

mately \$200 in OEM quantities, the firm said, and is expected to find applications in systems used for such things as airline ticketing, banking, bulk fuel dispensing, CRT data input and point-of-sale terminals, fare collection and identification devices.

American Magnetics Corp. is at 2424 Carson St., Torrance, Calif. 90501.

Philips Test & Measuring Instruments, Inc.

ANAHEIM, Calif. — Booth 3222 will feature an exhibit aimed more at other exhibitors than at end users, since Philips Test & Measuring Instruments, Inc. will use that site to show its line of test and measuring instruments.

Included in the display will be the 100mHz PM3500 logic state and timing analyzer with a 3nsec time and sev-

eral 100mHz oscilloscopes including the PM3266 transfer storage oscilloscope and the PM3263 microprocessor-based time measuring scope.

In addition, the firm's line of 25- and 35mHz scopes will be featured in the display.

The company is at 85 McKee Drive, Mahwah, N.J. 07430.

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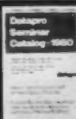
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12 NEW—Tuning-Up The Corporate EDP Function: A Management Primer for the 80's	May 14-16	Apr 23-25	May 28-30	June 9-11	July 9-11	
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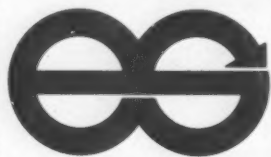
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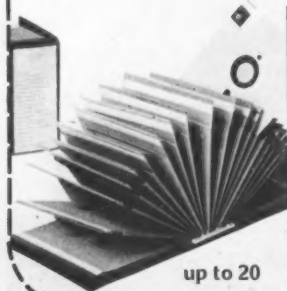
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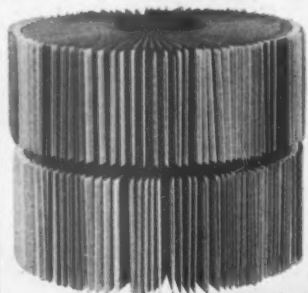


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Enhanced Monitor For MVS Supports 43-Line CRTs

MARINA DEL REY, Calif. — An enhanced version of its software display monitor for IBM MVS users that supports 43-line CRT terminals is available from Candle Corp.

Called Omegamon Version 300, the package reportedly extends a system's performance tuning and automatic exception analysis capabilities, the vendor said.

Adaptation to 43-line CRT terminals, such as IBM's 3278 Model 4, allows a user to simultaneously monitor TSO response time, CPU utilization, paging, Systems Resource Manager parameters as well as disk, channel and control unit contention, Candle Corp. said.

The package also contains a "Screen Space" facility that will

enable the user to capitalize on Omegamon's screen formatting capability by capturing screen images for re-use. The images can be stored via an 8-char. screen-space name. For example, an installation can have a standard screen, or a series of screens to be displayed when response time deteriorates, the vendor explained.

In addition, screen spaces can be used as a vehicle for sharing, tuning and diagnostic techniques, the vendor added.

The package costs \$15,000 for a perpetual license or \$6,500 for an annual lease. Omegamon requires 100K bytes of memory, Candle Corp. said from Suite 401, 4676 Admiralty Way, Marina Del Rey, Calif. 90291.

Univac 1100 Users Get Schema Definitions

BEDFORD, Mass. — Users of Univac 1100 series CPUs can generate schema definitions for that system's DMS-110 data base management system with an updated version of Synergetics Corp.'s data dictionary, Data Catalogue 2.

Synergetics also introduced an applications interface, available as a separate package, to provide on-line communications between user programs and the dictionary.

With Version 1.2.2 of the dictionary, users can define DMS-1100 entities to Data Catalogue 2. Once the definitions are stored, the dictionary's Schema Generation Facility will create schema definitions that can be

entered directly into DMS-1100, a Synergetics spokesman explained.

Applications Interface

The applications interface is said to let user programs call the dictionary for criteria — such as format and values — that can be used later to validate data input.

Because it is on-line to the programs, the dictionary accounts for changes in criteria when they are entered, the spokesman noted.

Prices are \$21,900 for Data Catalogue 2, Version 1.2.2, and \$3,000 for the applications interface from Synergetics Corp., One DeAngelo Drive, Bedford, Mass. 01730.

From Idea to Profit — Part 2 Software Poses Unique Legal Questions

By A.L. Frank

Special to CW

One legal issue a software author must at least consider in the early stages of product development for any industry is what form of legal entity he wishes to be.

Many people who sell the mar-

This second installment of a five-part article on bringing a home-grown software product to market discusses initial steps toward becoming a business.

keting rights to their products incorporate, but a corporation is not always the most desirable format. Selling a product involves substantial tax consequences, and there are certain tax benefits of which a corporation cannot take advantage.

In addition, the tax consequences of selling the product vs. granting marketing rights are significant.

Since the software industry holds many unique legal surprises, "it is also especially important in negotiations regarding software to have an attorney who is familiar with the industry and

its vocabulary," according to Gordon Davidson, an attorney with Fenwick, Stone, Davis and West and a specialist in software.

For example, he noted the term "maintenance" has a different meaning in the software industry than it does in other industries.

Moreover, "traditional legal concepts are sometimes unclear when applied to software," Davidson added. "Most state laws, for example, assess a sales tax on the sale of a tangible product, but is software tangible? Most states' tax authorities think it is, but a few courts have held that it is not."

Design From User Inputs

Once the software developer has evaluated the market, determined that his general concept for a product is in line with what users will want at the time it is complete and consulted legal counsel, he should then talk in detail with several potential users to define the specific features.

A useful way to plan the design is to rank the features in the order of their desirability in the marketplace. Coding can then proceed along those lines.

Many products, though, are not conceived according to a strict hi-

erarchy of features and benefits; instead, the design elements evolve as technical solutions to specific problems. Such "features" will not enhance the value of the product if they do not offer the user a distinct capability.

Sometimes the basic requirements for a product's marketability are overlooked during the design stage. Most often forgot-

ten is documentation. By writing the documentation first, a major portion of the project will be completed early. Also, incomplete documentation severely detracts from the value of the product.

When designing the product, developers should also remember that software companies look for

(Continued on Page 36)

Reporting System Fits IMS/DC, CICS, TSO

CANOGA PARK, Calif. — An on-line reporting system for IBM 370 OS/VS and DOS/VS systems that operates under IMS/DC, CICS or TSO was introduced by Informatics, Inc.

With Answer/DB, as the reporting system is called, users can enter English-like language report statements at a teleprocessing terminal and access DL/1 data bases and other files without knowing the structure of the data, the vendor claimed. Both on-line and batch data bases and files can be accessed.

The reporting system is said to provide an on-line library for saving queries and definitions, on-line browsing of processed reports, report formatting, access to multiple data bases or files using a single logical view of the data and multiple reports in one pass of the data base.

Answer/DB costs \$30,000 for DOS environments and \$35,000 for OS users. A batch entry option for OS installations is also available from Informatics at 21050 Vanowen St., Canoga Park, Calif. 91304.



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Software Industry Holds Unique Legal Issues

(Continued from Page 35)

easy-to-use products that will offer practical solutions to obvious problems.

Hard coded features, such as flags that must be changed and nontabular source code that must be modified for different applications, are usually not feasible in today's marketplace.

Once the product reaches the development stage, two basic resources will be required: programming ability and hardware on which to code. Both of these will impact the value of the prod-

uct to software companies and end users.

What programming language a developer chooses is a reflection of his programming ability. If he uses certain IBM program products, such as the optimized version of Cobol which IBM distributes to its users at a charge, he must recognize that his potential customers will be limited to those who have IBM's product.

So, the more common the language, the broader the potential marketplace.

Also, techniques, such as structured programming, that simplify maintenance are desirable because maintaining the product is a business in itself for software companies.

The effort involved in maintenance increases exponentially with the number of users so it is important to convince the software company that the product is relatively easy to maintain.

As with the choice of a programming language, the choice of hardware on which to code the product will also affect its potential market share. Hardware features found only on the machine used to develop the product may also be necessary to use the product, thereby limiting the end-user population.

The developer's marketing efforts, therefore, will be greatly simplified by using development resources that are very similar to his end-users' resources.

Proving the Product Works

A written, but untested, product is worth little more than raw ideas. Testing requires not only that the developer put the product through its paces to debug it himself, but that there be outside proof — a small user base — that the software performs according to specifications.

But how does a developer attract a user base for an untested product? A very viable solution to this problem is to develop a sponsorship program.

This involves contacting two or three key customer sites prior to completion of the product to arrange some form of discount — which could be up to 100% — in exchange for acting as sponsor sites.

These sponsor sites should provide not only a test facility, but also written evaluations and an agreement that they will serve as references.

It is important to emphasize that the customer base, or sponsor sites, may be small, but must consist of real users. Two or three customers who own the product but use it once every six months do not constitute a credible customer base.

However, two or three organizations that have used the product for a period of time as changes or enhancements have been made, give credibility to the

developer's claims.

A word of caution — an open-ended contract with sponsor sites may be disastrous. Consult an attorney before installing the product to be certain you are not giving away ownership.

And be very cautious of maintenance obligations which, if poorly defined, may constitute a defective customer agreement that most software companies will not accept.

Alternate Approach

Another approach to testing was cited by Ross Allardice, codeveloper of Resolve, which was acquired by Boole & Babbage, Inc. in 1976.

"We had several products installed when we sold the rights to Resolve so instead of testing the product at a sponsor site, we bought testing time at an installation," Allardice said.

"Then, we sold copies of the product through direct mail and advertising. The key here is that the product was offered on a 30-day free trial basis."

The cost of developing a large customer base in a short amount of time is not feasible for most authors. The cost of advertising, promotion, product maintenance and service, added on to the initial development cost, can defer any profits longer than the author can wait.

Therefore, a more economically cautious approach is advisable, according to Mario Morino, president of Morino Associates, Inc., the firm from which Boole & Babbage acquired Control/IMS.

"An individual is best off easing into a market if he plans to sell products to end users," he advised. "That is, rather than investing a lot of money in establishing a broad customer base, he should concentrate his efforts on a small geographic area that he can service without a great deal of overhead."

"This will provide him with some income until he sells the marketing rights. Selling marketing rights is especially desirable to an individual or group just entering the software market," Morino said, "because the revenue from that sale will fund the development of a second product."

Frank is an attorney and the director of corporate development with Boole & Babbage, Inc. in Sunnyvale, Calif.

CDC Service Lets User Build Information Base on Cybers

MINNEAPOLIS — Control Data Corp. is offering a set of software services and products for designing information systems around its Cyber series of CPUs models 720 through 760.

Targeted to both technical and non-technical user management, Control Data Information Analysis Services (CDIAS) involve three sequential steps:

- Designing an information base according to specifications developed by the user and a CDC systems analyst.
- Building a pilot model or prototype for testing.
- Achieving full-scale production of the information system based on a successful prototype.

Users can participate in the first two CDIAS program stages without committing to a hardware purchase, a CDC spokesman said. To support the initial design stage, CDC provides a series of educational courses, seminars and workshops to teach the principles of CDIAS.

In the second stage, professional consulting services and software systems specialists assist the user in developing, implementing and evaluating the prototype data base. This is done by using terminals at the user site that link to a central mainframe at one of CDC's Cybernet centers, the spokesman explained.

At stage three, CDC will help users implement the hardware and software deemed necessary based on the results

of the modeling operation.

Fundamental to CDIAS is a conceptual schema — that is, a description of the information base contents, the meaning and content of the information and a set of rules to guard against changes in meaning as the system evolves, CDC said.

The conceptual schema is expressed in natural language for processing on CDC's Information Management Facility (IMF) software programs that operate under the firm's Cyber network operating system in batch, remote batch and time-sharing modes.

IMF can be used to construct models as well as the production-level information system, the spokesman noted.

CDIAS Backup

CDIAS backup at the user site consists of analyst and programming services as needed; software maintenance; training programs, many of which use the firm's Plato computer-based educational software; and terminal services to the central computer.

Prices for CDIAS typically range from \$895 to \$2,780 for a monthly license and between \$49,590 and \$128,760 for a paid-up license.

Prices at the lower range include analysis of customer information needs and three training classes. Upper range prices include the full training program and IMF software to handle a data base of the size that can be accommodated by a Cyber 760.



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For Pixnet, Response Users Paradyne Adds 3270-Type Terminal

LARGO, Fla. — Paradyne Corp. has given its Pixnet and Response network users an intelligent CRT terminal billed as functionally equivalent to IBM's 3277 and 3278-2, and featuring integrated diagnostics.

Up to 32 of the terminals, Paradyne's PDS270, can run in a Pixnet/Response cluster. They eliminate polling and reduce response time by allowing the 3270-compatible user to operate the entire terminal network as if it were in local mode, a spokesman claimed.

By attaching a PDS270 to Paradyne's Local/Remote Control Unit (LRCU), the user can access any host mainframe application from each associated terminal or printer, the spokesman said. Paradyne's Remote Control Unit (RCU) permits a single attached PDS 270 controller to drive up to 32 peripheral devices, which appear as "local" to the host.

RCU/PDS270 links give Pixnet users access to multiple applications residing in multiple CPUs throughout the network, the spokesman said.

When attached to Paradyne's Response communications system, the PDS270 emulates a 3270 and can access applications in a Response or other mainframe within the network, the spokesman stated. The PDS270 can be located remotely from a Pixnet or Response control unit via conventional voice-grade dial-up or private lines.

Both point-to-point and multidrop configurations are supported.

Raster-Scanning CRT

With raster scanning, the terminal's 15-in. CRT displays 128 different characters in 24 rows of 80 characters each. A 25th row is reserved for operator messages and network status reports.

The PDS270 also has an integral response time monitor; "high-speed" loop technology; support for IBM's Synchronous Data Link Control protocol, with data compression routines; a 6 by 16 character display matrix; and 67 keys in the keyboard. An adjustable tilt feature provides 16° of tilt for enhanced operator comfort, the spokesman continued.

Announced last fall (CW, Oct. 22), Response is Paradyne's distributed processing system. It uses the Pixnet system to provide interactive and bulk file transfers among any processors in the network.

Response uses the IBM 370 instruction set

and requires no system generation procedure, according to the spokesman.

A Pixnet controller cabinet can contain a PDS270 controller, which drives the high-speed loop and loads CRT terminals with appropriate software when powered on. The terminals work with Paradyne's 75- and 160 char./sec bidirectional printers.

Lightwave Communications Test Sending Data at 6.3M Bit/Sec

By Bruce Hoard

CW Staff

NEW YORK — A digital lightwave communications system reportedly capable of transmitting 6.3M bit/sec is being tested here. Few present systems can achieve rates in excess of 56K bit/sec.

New York Telephone Co., Bell Laboratories and the Western Electric Co. worked jointly to develop the system and expect it to increase in speed as it becomes more refined, according to New York Tel spokesman Charles Herndon.

The key to the system is fiber-optic cable. It readily accepts the pulse-like binary data flow without requiring analog modulation and theoretically allows a computer to transmit data as fast as it can process it, Herndon explained.

A typical PDS270 configuration consisting of a single controller with 12 PDS270 terminals and a 160 char./sec printer costs \$63,000 or leases for three years at \$1,212/mo, including maintenance. Deliveries of the PDS270 will begin in August, Paradyne said from 8550 Ulmerton Road, Largo, Fla. 33541.

The purely digital nature of the transmission makes the system virtually immune to data transmission errors caused by minute changes in the electrical field through which the data flows, according to New York Tel Planning Engineer Frederick Frintrup.

"The pulsing of the light source, the laser or light-emitting diode, is a digital bit stream and all electronics associated with it are digital so there's no encoding or decoding to analog. Therefore, the stream is pure," Frintrup said.

There is also no chance the system can be "tapped" along its route because the fiber-optics cable does not have an electromagnetic field around it in the manner of conventional telephone lines, he said. The system would go down immediately if someone

(Continued on Page 38)

EMS Planned for Bulk Mailers

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — A bulk electronic mail system (EMS) that promises substantial savings to credit card merchandisers, retailers, public utilities and others who routinely have correspondence with large numbers of customers is scheduled to begin within the next few months. Called Tyme-Gram it will be offered by Tymnet, Inc., Tymshare Corp.'s value-added carrier subsidiary.

Tyme-Gram rates will be "about two-thirds less" than Western Union Telegraph Co.'s Mailgram charges, according to Tymnet Sales Vice-President Jack McDonnell.

Tyme-Gram was one of a number of

new offerings McDonnell described at the recent Federal DP Expo here and in a subsequent interview with *Computerworld*. He also talked about:

- Ontyme II, the recently upgraded version of the "electronic mailbox" service the company began three years ago.
- A new credit authorization terminal for retailers, designed to compete with AT&T's Transaction II equipment.
- Enhancements to the Tymnet time-sharing service that allow users of IBM 3270- and teletypewriter-compatible terminals to communicate with a wider variety of remote computers and terminals.

Tyme-Gram, the bulk electronic mail
(Continued on Page 42)

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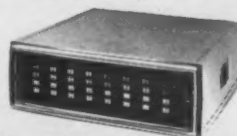
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Modem, Phone Combined

SUNNYVALE, Calif. — A telephone that incorporates a built-in Bell-compatible modem has been announced by Racal-Vadic, Inc.

The firm installed a switched network 300 bit/sec full-duplex Bell 103/113-compatible modem into rotary and Touch-Tone phones. Data terminal users need only connect a terminal to the VA103 Modem-Phone to begin communicating, a spokesman said.

With its built-in direct-connect originate/answer modem, registered with the Federal Communications Commission, the VA 103 Modem-Phone connects into a standard RJ11C phone company jack or RH41S or 45C programmable data jacks. It comes equipped with an

8-ft cable and phone company plug plus a 25-pin connector to accept the RS-232C interface.

The Modem-Phone will directly replace Bell 103A/103J, 113A, 113B, 113C and 113D modems or their equivalents, the spokesman said. Four versions of the Modem-Phone are available. The VA103-MA rotary and VA103-MB Touch-Tone units cost \$250 each with manual originate and answer; the VA103-AA rotary and VA103-AB Touch-Tone units offer both manual and automatic originate/answer for \$330. Upgrades from the manual to the manual/automatic Modem-Phones are available.

Racal-Vadic is at 222 Caspian Drive, Sunnyvale, Calif. 94086.

GDC Adds Another Modem

DANBURY, Conn. — A microprocessor-based 9,600 bit/sec modem for applications such as point-to-point or multipoint links between high-speed terminals and a host CPU has been unveiled by General Datacomm Industries, Inc. (GDC).

The Model 9602 permits full-duplex serial synchronous communications over four-wire leased lines. It features fallback rates of 7,200 bit/sec and 4,800 bit/sec and conforms to RS-232C, CCITT V.24 and CCITT V.28 specifications, GDC said.

An optional four-port time-division multiplexer allows medium- or low-speed terminals or collocated modems to be clustered at up to four ports to share a long-distance circuit.

Instead of bringing individual data links to a host CPU on separate lines,

the plug-in option permits simultaneous, independent transmission for each subchannel at a fraction of the cost of separate lines, the vendor claimed.

A remote diagnostics package allows a single main terminal operator to perform all necessary diagnostics without posting an operator at remote sites. The Model 9602 costs \$6,545 and the multiplexer option costs \$850, the firm said from 1 Kennedy Ave., Danbury, Conn. 06910.

Lightwave Test At Work in N.Y.

(Continued from Page 37)

broke the cable in an attempt to intercept data.

The downtown Manhattan test system links telephone buildings at 50 Varick St. and 375 Pearl St. The binary signals travelling between those two points are routed through an optical regenerator at a midway point.

The optical regenerator has proven to be unnecessary because the signals have been retaining their strength during transmission, Frintrup said.

As part of the trial, nearly 100 employees working in the Pearl St. building will have their phones connected to the lightwave system. These phones are part of the "distribution" side of the communications network, the name given to the portion connecting a central office with the customers' equipment.

The test will bring the Bell system close to the point where it can make similar lightwave systems commercially available, Frintrup said, adding he hopes that will happen by the end of 1982.

The Manhattan test system is not the first. Earlier this year, New York Tel used its predecessor — Bell's first such system — to carry telecast signals of the Winter Olympic Games from Lake Placid, N.Y.

Another, more ambitious system under construction will originate in Manhattan and connect the city with White Plains, N.Y. That link is expected to be complete by the end of 1981 and will be expanded to cover the entire Boston to Washington, D.C., Northeast Corridor by the end of 1983.

Greatly facilitating the New York system is the availability of a network of underground air pipes about half an inch wide that run throughout the city. The air pipes are used to pressurize communications cables and help prevent them from getting wet.

The air pipes are useful for lightwave purposes because New York Tel will be able to run its new three-eighth-in. fiber-optic cable through unused ones, avoiding a great deal of expensive construction, Herndon said.

"The three-eighth-in. cable has voice and data handling capability equivalent to three 4-in. standard wire cables," he added.

The trial marks the first time that Bell has spliced fiber-optic cable in the field, Herndon said. Previously, specialized splicing techniques dictated that lightwave cable lengths be fitted with connectors at each end on manufacture by Western Electric and then plugged together for long runs in the field.

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Net Breaches Seen Impetus for Data Encryption

By Brad Schultz
CW Staff

WASHINGTON, D.C. — Most commercial data communications users have little interest in encryption right now, but they would hurriedly adopt such security methods if a rash of serious network breaches came to light, according to a research team of Carnegie-Mellon University students.

Encryption will eventually be widespread in the private sector, the students predicted at a George Washington University seminar here recently. After demand for better network security grows to a certain point, they added, users will get high-quality encryption gear at low cost.

But vendors need an appropriate set of standards for commercial encryption products before they can profitably address that demand, according to Univac engineer Jim Nelson [CW, May 5]. Nelson has guided American National Standards Institute (Ansi) efforts to turn out such standards.

Three organizations are now generating encryption standards for the DP and telecommunications industries: the Commerce Department's National Bureau of Standards (NBS), which is primarily concerned with encryption standards for civilian federal users; Ansi, which focuses on the private sector; and the International Standards Organization in Geneva, Switzerland.

DES Adoption

The NBS adopted the best-known encryption standard in 1977 — an algorithm developed by IBM and now com-

monly known as the Data Encryption Standard (DES).

Nearly all civilian federal users are required to employ the DES when they encrypt computer-stored data, but the U.S. armed forces forbid its use as protection for top secret military information.

Commercial Offerings

Perhaps because commercial interest in encryption has lagged behind government in-

terest, Motorola Corp. developed its DES-based cryptosystems line in the firm's Government Electronics Division and later started selling the line to commercial users through its Codex Corp. subsidiary.

Recently, Siemens Corp. began to offer businesses devices based on a cryptographic algorithm developed in Switzerland and claimed to be more powerful than the DES.

Produced by Hagelin-Crypto AG, the two models in Siemens' HC-5000 series feature roughly 10^{11} and 10^{14} different encryption key possibilities, respectively, according to a Siemens spokesman.

A Siemens press release mistakenly indicated that the HC-5000s were capable of only about 10^{11} key variations (roughly a thousand fewer than the DES allows), he said.

That led to an erroneous

comparison between the two methodologies in *Computerworld's* coverage of the Siemens announcement [CW, March 17].

The number of key variations amounts to the number of ways in which the algorithm may transform a packet of digital data, suggesting how vulnerable the algorithm is to "brute force" attacks, the most simplistic breach strategy.

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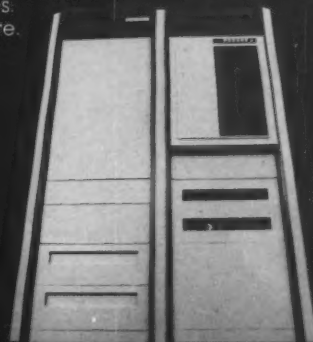
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System Converts Voice Into Terminal Output

By Phil Hirsch

CW Washington Bureau
WASHINGTON, D.C. — An "electronic mailbox" that converts voice input into data terminal output and vice versa was described at a recent conference here.

The system is now being implemented by Micronet, Inc., an office automation consulting firm, at its "paperless office" demonstration center in Washington. Voice recognition equipment, voice synthesizers, randomly accessible audio disk storage and remotely

controlled dictation facilities are the system's key elements.

Using a standard telephone, a caller at a remote location can store a message on the audio disk. Alternatively, messages generated from remote data terminals can be converted to audio by the voice synthesizer equipment.

Once either type of message is recorded, the called party can retrieve it at any time using spoken commands processed by the voice recognition equipment. That equipment controls a computer-

based random-accessing system that finds and retrieves the messages from audio disk storage.

The voice recognition equipment, in response to the user's spoken command, first transfers each audio disk-recorded message to the dictation equipment. After being input through an on-line keyboard at that point, the message is then transmitted to the user's receiving terminal.

A major benefit of this system, Larry A. Stockett of Mi-

cronet explained, is that "every telephone becomes an electronic mail/message terminal." No modems are required, and the need for terminal operator training is eliminated, he added.

Stockett was the first speaker at a conference session entitled "Electronic Mail and Message Systems — Myths and Realities." He was followed by Jeffrey Held of Richard A. Deal & Associates, a DP and data communications consulting firm.

Discussing facsimile and communicating word processor (CWP) equipment, Held said facsimile provides the most economical electronic mail service today. Not only is the terminal considerably less expensive than CWPs, but standards have been developed for all analog facsimile machines, and common carriers such as International Telephone & Telegraph Corp. provide a means for analog and digital fax units to communicate with each other.

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(Continued from Page 37)
service, is similar to Electronic Computer-Originated Mail (Ecom), the much-discussed but still-delayed offering proposed by the U.S. Postal Service. Tyme-Gram will be offered initially in 25 U.S. cities. Users will feed their message texts and headers on-line to a Tymnet center, and the information will then be transmitted by the network to a commercial mailing house in each destination city. There, it will be printed out.

The mailing house will then place the individual messages in envelopes and deliver them to a local post office for forwarding to the recipients.

Standard message texts and address lists will be stored internally by Tymnet; once a customer begins using the service, it only has to supply the changes to the message texts and address lists. O'Donnell said Tyme-Gram will guarantee next-day delivery to addressees in all 25 cities and some of the surrounding areas. The next-day delivery zone, he added, encompasses 65% to 70% of the U.S. population.

More Interfaces

Since last fall, Tymnet has offered software interfaces that allow IBM 3270 terminals to communicate over its packet-switching network with Burroughs Corp., Digital Equipment Corp. and other non-370 host mainframes. The software makes the 3270 look like an asynchronous Ascii terminal.

Tymnet now allows a synchronous or asynchronous Ascii terminal to emulate the 3270 and communicate with a 370 host. Some 3270 CRT functions must be suppressed in this latter emulation because a standard Ascii terminal cannot implement them, but Tymnet has gotten around the problem, McDonnell said, by developing an asynchronous buffered CRT terminal, the Model 470, which "does everything that a 3270 does."

At the moment, Tymnet's 2780/3780 interfaces allow connection only with identical

terminals, but "virtual" interfaces are promised for later this year. This software will make 2780/3780 units look like asynchronous teletype-writers or synchronous X.25

terminals and will permit communications with DEC, Burroughs, Tandem Computers, Inc. and Prime Computer, Inc. host processors, among others, McDonnell said.

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To Run OS/VS1

IBM Delays Inspire Move to Omega II

By Rita Shoor
CW Staff

CHICAGO — When Benefit Trust Life Insurance Co. (BTL) here decided to convert its installation from a Control Data Corp. hardware and software environment to an IBM operating system, it thought it would be running its OS/VS1 system on an IBM 4331.

Fate intervened in the form of several delays in the promised delivery date for the 4331. As a result, BTL joined the ranks of companies running IBM software on compatible mainframes — in this case, the Omega II, marketed by CDC.

BTL is a life and health insurance company licensed in every state. The company claims a position of "approximately 90" in premium volume for life insurance and "somewhere in the 20s" in premium volume for group insurance among the top 1,800 life insurance companies.

"Our first conversion was from an entirely manual system to an IBM 1401," Raymond Dash, senior vice-president of information systems, recalled.

The 1401 saved everyone so much when compared to manual systems that no other upgrade has looked as good when viewed proportionately.

Initial Proposals

In 1968, BTL upgraded to a 128K-byte CDC 3300 mainframe. Dash was serving as a consultant to the company, when the selection was made from among CDC, IBM and the Radio Corp. of America (RCA). "I wanted an IBM OS or OS-equivalent system. The initial proposals from IBM and CDC were for DOS systems.

"When I made my views clear, IBM delayed changing its proposal for reasons of policy. CDC came up with an OS-equivalent system and offered good system engineer support and some remote job entry (RJE) terminals with the package.

"In addition," Dash said, "the CDC system was less expensive than IBM OS."

The company went through a series of upgrades with CDC to get to a configuration that included 756K bytes of main storage, 11 disk drives, nine tape drives, 24 CRTs, two printers and two card readers. All of the peripherals were from CDC because the 3300 is not compatible with other vendors' equipment.

Time for Change

By 1975, BTL was looking for a new system. Dash, who had joined the company during this period, maintained that CDC "had nothing bigger that was suitable for us."

Among the reasons given for the conversion to an IBM system environment were the availability of IBM plug-compatible products, the expense of main-

taining the CDC 3300 and an apparent preference among some programmers for working in an IBM shop.

It was also becoming difficult to get good maintenance support from CDC's customer engineers. "A good CE wants to work on the newer equipment," Dash explained.

The conversion of some 550 Cobol batch programs began in early 1979. The programmers were using a Data 100 Corp. (now Northern Telecom Systems Corp.) RJE terminal to run the programs under an IBM OS/MVS system at the Computer Research Co. service bureau.

May Delivery Guaranteed

"At that point, our schedule called for keeping the RJE terminal until the third quarter of 1980." In February 1979, however, an IBM salesman guaranteed delivery of a 4331 by May of the same year if BTL would declare themselves an IBM test site. "I was given just four business days to make that decision," Dash noted.

BTL agreed to go with IBM's proposal and ordered a 4341 at the same time. Successive delivery dates for the 4331 were not met, and the company wound up in IBM's 4300 series delivery lottery in June.

The final promised delivery dates were January 1981 for the 4331 and January 1982 for the 4341.

Delays and Doubts

"While the delays were taking place, we began to look at compatible mainframes," Dash said. "We were having doubts about the 4331 being able to meet our future needs.

"In fact, one of the tools I used in surveying other vendors' systems were the charts published in *Computerworld* on IBM software-compatible mainframes" [CW, Jan. 8 and Feb. 5, 1979].

"When I told IBM I was seriously considering the Omega

(Continued on Page 44)

OS Conversion Running on Target

By Rita Shoor
CW Staff

CHICAGO — How does a company implement a complete operating system conversion with minimal impact on its application production system?

Benefit Trust Life Insurance Co. (BTL) here is doing just that — and there has not been a nervous breakdown in the DP department yet.

BTL began the conversion process from a Control Data Corp. system on a 3300 mainframe to an IBM OS/VS1 system with CDC Omega II computer in February 1979.

The first step in the process was the conversion of some 550 batch programs from CDC Cobol to IBM Cobol. "We began by sending our systems programmers to the IBM Data Center for classes in OS," according to Raymond Dash, senior vice president of information systems. "Then we hired a consultant to teach OS concepts and job control language (JCL) to the applications group and to define the JCL default standards for the shop."

Setting a Schedule

"We felt that a definite conversion schedule was essential in order to keep things moving," Dash continued. In order to come up with this schedule, a program was written that read application programs from the source library; printed out the first two divisions, the number of lines in each program and the types of files being accessed; and indicated whether the program included copied subroutines or called assembler modules. These criteria were used to assign the programs a "conversion difficulty" rating of 1, 2 or 3 on an ascending complexity scale.

Another factor in schedule determination was an experiment by Dash in converting a Fortran program from IBM to CDC format. "It took me approximately five hours to complete the conversion. This helped to give me some feeling for how long it could take our programmers — whose experience ranges vary widely — to come up with clean compiles and successful parallel tests while they were maintaining production systems and still responding to requests from our user departments."

The final schedule called for the applications group to convert an average of one program per week. The entire staff, which increased 18 to 24 people during this period, worked half of each day on conversions and the other half on program maintenance and development.

"The only things allowed to override this are the occasional hot jobs that are factors in any DP programming environment," Dash noted.

In order to provide some motivation for keeping to the schedule, a bulletin board was posted in the programming area listing each programmer's name along with the assigned programs and weekly completion dates.

Color codes indicated a clean compile, a successful test and production implementation. This posting made managers and technicians aware of each individual's contribution to the con-

(Continued on Page 44)

DEC Unveils VAX-11/780 Interface

MAYNARD, Mass. — A hardware interface that reportedly transfers data between external devices and the VAX-11/780 processor at rates up to 6.67M byte/sec has been announced by Digital Equipment Corp.

The DR780 interface features a synchronous 32-bit parallel data interconnect and an asynchronous 8-bit control interconnect. Separate data and control paths enable data and control signals to be transmitted simultaneously, DEC said.

Parity checks are maintained and detected errors are logged by the DR780, a spokesman added.

The interface was designed for high-data-rate applications such

as seismic data processing, telemetry data reduction, nuclear reactor monitoring and high-resolution spectrometry. It can also function as a link between two DR780-equipped VAX-

11/-780 systems.

With interface logic, power supply and 25 ft of cable, the DR780 is priced at \$18,700. Deliveries will start in September, DEC said.

Wabash Raises Prices 9%

DES PLAINES, Ill. — Wabash Tape Corp. has raised the prices of its magnetic media products an average of 9%. The increase was the second on Wabash's product line this year.

"Escalating production costs" for the company's G-Tape line accounts for most of the increase, which became effective April 15, according to Ferris L. Johnson,

vice-president and general manager.

Quadronix brands will go up 7.5% and dual-sided, double-density products will increase 2% to 3%. Standard single-sided variations will not be affected by the increase.

Wabash is located at 2700 Des Plaines Ave., Des Plaines, Ill. 60018.

Burroughs Links OCR, WP

BURLINGTON, Mass. — Interfaces that make the Burroughs Corp. Model 1210 optical character recognition (OCR) page reader compatible with word processors built by Xerox Corp., CPT Corp., Micom Systems, Inc. and Lexitron Corp. have been introduced here by Burroughs.

The interfaces allow owners of these word processing (WP) systems to plug the 1210 OCR reader directly into the communications port "without special software, disk-writers or 'black boxes,'" according to Burroughs.

The products can be purchased for \$15,900 or leased for \$675/mo., including maintenance, through Burroughs distributors.

Burroughs Corp. is located at 9 Ray Ave., Burlington, Mass. 01803.

IBM Delays Spur Move to Omega

(Continued from Page 43)
II, it called one week later and said it had a 4331 for me." Dash then conferred with members of the Systems and Operations Council for the Life Office Management Association (Loma).

"The consensus was that the Omega II would be the better choice for BTL," the BTL vice-president said.

Dash cited the facts that the Omega II is a "faster" machine, handles more channels

and is upgradable to 4M bytes of main memory as contributing to his decision.

The Omega II was installed in November 1979. That configuration included six Telex Computer Products, Inc. tape drives, an IBM 2501 card reader, a printer, and four CDC 33-302 disk drives.

Two IBM 3274 controllers and 15 Model 3278 CRTs are scheduled to arrive within a few weeks.

"We are trying to keep hard-

ware costs down," Dash maintained. "We intend to remove the 3300 as soon as possible."

"Our current monthly cost of \$10,000 to maintain that mainframe, along with the \$2,000/mo we're paying for leased CDC peripherals, will more than cover the monthly rent for the Omega along with additional peripherals equipment."

Conversion On Schedule

(Continued from Page 43)
version effort.

Programmers use Data 100 Corp., (now Northern Telecom Systems Corp.) remote job entry terminals to compile and test the programs under an OS/MVS system at a service bureau.

Conversion testing was improved when Bill Hughes, a systems programmer, wrote a program to convert the CDC sequential files to an IBM sequential file format — no mean feat because CDC is an octal system with binary rather than packed fields, Dash said.

"Although nobody enjoys the conversion process, it's been a learning experience. The programmers feel that their turnaround time on each job will improve once everything is running on the Omega II, and they're looking forward to having tools like on-line Panvalet to work with," according to Dash.

The reaction from the operations staff, which includes experienced IBM operators, is that an OS/VSI system is "easier" to run than the CDC operating system, although problems have been encountered.

For example, OS/VSI initiates a job before ensuring that all the required resources are available. If the resources are not free, the operator must cancel the job and then reenter it.

BTL's goal was to convert all the batch programs by May 31, 1980, and Dash said that BTL will come "pretty close" to meeting that date. The next phase will involve converting BTL's on-line programs.

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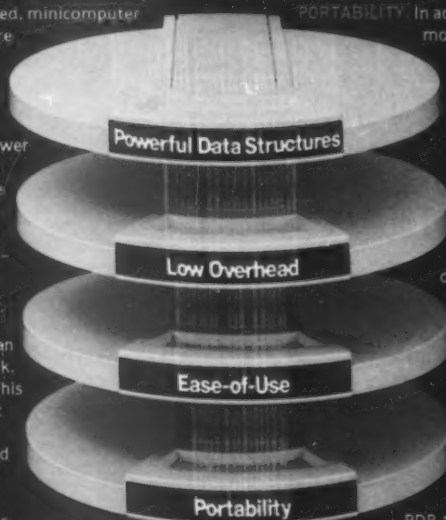
If you are designing a sophisticated, minicomputer based information system, you are probably facing a dilemma: How to build for the 80's with early 1970's data management tools.

Traditional non-data base techniques lack the necessary power and flexibility. And the hardware vendors' approaches to DBMS are quite often system dependent, memory intensive, or simply not available. There is a solution — Minicomputer TOTAL. Only Minicomputer TOTAL offers you:

POWERFUL DATA STRUCTURES. With Minicomputer TOTAL, you can choose from hierarchical, network, or multi-keyed data structures. This means you can build the simplest to the most sophisticated information system. And this kind of flexibility is important to your needs today — and as you grow.

LOW OVERHEAD. Even with all its power, Minicomputer TOTAL is extremely efficient. In fact, TOTAL has the lowest overhead requirements of any full facility DBMS available today. Its powerful design minimizes I/O, memory requirements, and disk space. This gives you all the benefits and flexibility of the TOTAL Approach while minimizing your hardware costs.

EASE OF USE. And Minicomputer TOTAL is easy to learn and use. Data base design and application programming can be mastered after only two days of technical training. The result: short learning curve, faster implementation and higher overall productivity.



PORTABILITY. In addition, TOTAL is the industry's most portable DBMS. Only TOTAL

offers horizontal data base portability across 18 different minicomputers and operating systems, while providing vertical compatibility to Series 80 TOTAL in the mainframe environment. This flexibility enables you to (1) develop applications centrally and distribute them to users with different target minicomputers, and (2) lay a solid foundation for distributed data base. So if a powerful, efficient, and portable information system is what you're looking for to meet the challenges of the 80's, you can't afford to overlook TOTAL.

If you're presently working with or considering... DIGITAL PDP-11 or VAX, HONEYWELL Level 6, IBM System/3 or 34, PRIME 150 through 750, PERKIN-ELMER (Interdata) 7/32, 8/32 or 3200 Series... you can use TOTAL now. To see first hand if Minicomputer TOTAL is the solution to your specific application design requirements:

Call our Minicomputer Products Hotline 513/661-6000

Reserve a seat at one of our seminars to be held in major cities during May and June. Or for immediate action — ask for Jim Sing. OEM's ask for Harold Daniels.



Cincom Systems, Inc.

Minicomputer Products Division

2300 Montana Avenue, Cincinnati, Ohio 45211

Correction

MINNEAPOLIS — The price of Dicomed Corp.'s line printer simulator for its D148B and D148C Graphic computer output microfilm systems was printed incorrectly in the April 7 issue of *Computerworld*. The 5505 Printer Simulator costs \$7,500 and is available immediately from Dicomed Corp., 9700 Newton Ave., Minneapolis, Minn. 55431.

HP Extends System 45 Line

Desktop Unit Offers Color Graphics CRT

PALO ALTO, Calif. — An integrated desktop system featuring a color graphics CRT screen, light pen, thermal line printer and nearly 200K bytes of user memory has been unveiled by Hewlett-Packard Co.

Designed to handle complex design and analytical problems, the Series 9800 System 45C provides three-dimensional data representations in eight different colors and up to 4,913 assorted color shades. Seventy graphics statements relieve the user of a number of programming tasks, such as geometric figure generation, and minimize program development time, HP claimed.

The System 45C's tricolor, shadow-mask CRT has a 560 by 455 dot display. Commands allow the display of alphanumerics and lines in the various color combinations and let the user specify fill-in colors numerically by selecting from standard color models.

The heart of the system is the graphics firmware that not only incorporates 35 commands supplied with previous System 45 computers, but also includes 35 enhanced commands that control color and use of the system's light pen in graphics applications, a spokesman said.

The System 45C provides individual access to its three memory planes and assignment of red, green and blue color guns to these



The HP System 45C

planes in any Boolean combination, letting the user utilize the 4,913 color shades to fit each graphics application. In addition, the system can simultaneously display both alphanumeric and graphics rasters, according to the spokesman.

The light pen was designed to let the user pick, move and construct objects on the

CRT, on a dot-by-dot basis if needed. The pen can also be used for tree-structured, dynamic branching while using a menu flashed on the CRT screen, the spokesman continued.

The standard System 45C package, at \$39,500, consists of the color CRT and color graphics firmware, interactive light pen, 187K bytes of user-available memory, two 217K-byte cartridge tape drives and an internal 80-column, 480 line/line thermal printer. However, an entry-level system is available for \$31,500 that includes 56K bytes of memory and one tape drive, but no light pen or printer.

Like its monochromatic System 45B cousin, the 45C can be supplied with optional user memory up to 449K bytes, the HP spokesman noted from 1501 Page Mill Road, Palo Alto, Calif. 94304.

National Semi Packs 512K Bytes On Single Card for VAX-11/780

SANTA CLARA, Calif. — National Semiconductor Corp. has announced a high-density memory board that offers 512K bytes on a single card for Digital Equipment Corp.'s VAX-11/780 supermini.

The NS780 is a direct replacement for DEC's M8210 memory. It features a partitioned power plane that concentrates power only on the memory elements and refresh circuitry in battery backup applications, National Semi said.

The card has an on-line/off-line switch that aids in reconfiguring and troubleshooting by allowing the memory to be electrically removed from the system without physically removing the card from the VAX backplane, a spokesman explained.

The NS780 has a 225 nsec access time and a 425 nsec cycle time, arrived at by testing the device for a 72-hour period at 70°C, he added. It is fully compatible with all VAX-11/780 hardware, software and peripherals and can be installed without setting address switches or adding option jumpers, he claimed.

The NS780 costs \$6,995. Additional information on the card can be obtained from National Semi at Mail Stop 7C-265, 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Alternative to IBM 5256 Printer Available From Decision Data

HORSHAM, Pa. — A 150 char./sec serial printer for the IBM System/34 that can be used as an alternative to the IBM 5256 has been introduced by Decision Data Computer Corp. The Decision Data 6541-04 is reportedly also compatible with IBM's Series/1, System/38 and 5280 Distributed Data System.

The 6541-04 provides a 25% increase in rated speed at a 25% reduction in purchase price over the 120 char./sec IBM 5256 and a 375% increase in speed at a 5% reduction in purchase price when compared with the 40

char./sec version of the IBM printer, Decision Data claimed.

The table-top 6541-04 prints bidirectionally across a full 132 columns. Its purchase price is \$4,895; the monthly leasing rate is \$175 on a two-year contract.

Decision Data is offering a maintenance contract through its nationwide service organization.

The vendor is located at 100 Witmer Road, Horsham, Pa. 19044.

Heath H89 Gets Floppy System

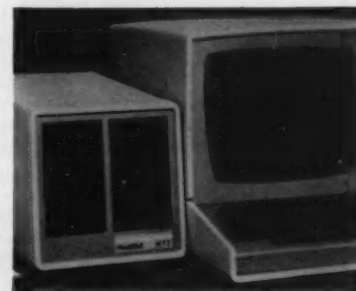
BENTON HARBOR, Mich. — Heath Co. has introduced a floppy disk system for its H89 microcomputer that provides up to 200K bytes of storage on two hard-sectored diskettes.

The H77 disk system utilizes Siemens Corp. Model 82 drives and is said to have a sector access time of less than 250 msec. By adding the system to the H89 and its disk drive, users have a three-disk capability and can run operating system and program disks at the same time, a spokesman said.

The floppy disk unit costs \$595 in kit form, which includes a single disk drive. A second disk for the kit costs \$325. The price of a factory-assembled and tested two-disk system is \$1,195.

Information on the unit is available from

Heath, Department 350-280, Benton Harbor, Mich. 49022.



Heath H77 Floppy Disk System

TI Users Gain Bubble Memory

BENTON HARBOR, Mich. — A bubble memory board that supplies 69K bytes of nonvolatile, nonmechanical mass storage for Texas Instruments, Inc. 990 minicomputers and microcomputers is available from Digital Interface Systems, Inc.

Features of the 090-040 board include a 7.5 msec access time to the first byte, a less than 20W worst-case power consumption and a provision for connection to an external load switch, a spokesman stated.

The board is physically and electrically compatible with TI's 990/4, 990/5, 990/10, and 990/12 processors, he claimed. It is priced at approximately \$1,950 from Digital Interface at P.O. Box 1446, Benton Harbor, Mich. 49022.

MULTIMEDIA

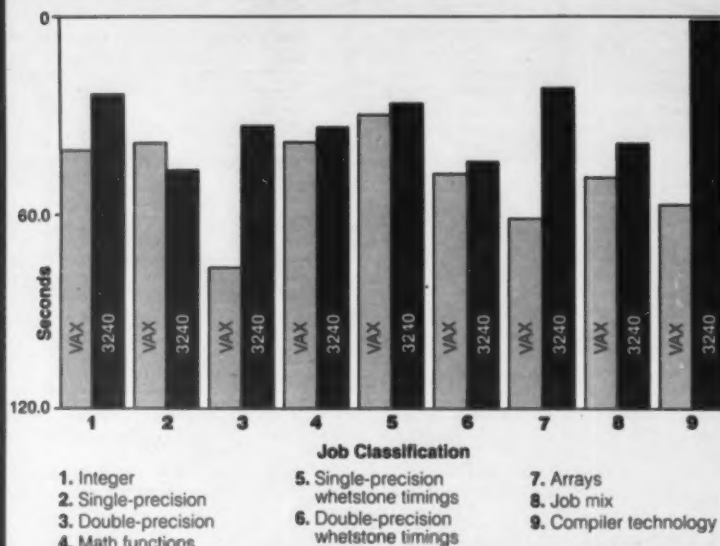
The benchmarks prove it...

1. Performance Measurements

Benchmark Name	VAX 11/780 CPU time	Perkin-Elmer 3240 CPU time	Performance Ratio*
PMS0154	1.140	0.907	1.26
PMS0254	4.710	4.485	1.05
PMS0354	9.160	8.990	1.02
PMS0454	43.610	43.451	1.00
PMS0554	86.420	86.123	1.00
PMS0664	1.610	1.350	1.19
PMS0764	7.040	6.679	1.05
PMS0864	13.730	13.370	1.03
PMS0964	66.830	66.068	1.01
PMS1064	132.920	129.727	1.02
PMS1124	1.520	1.306	1.16
PMS1234	2.470	2.424	1.02
PMS1324	1.310	1.618	0.81
PMS1407	251.560	37.327	6.74
PMS1507	50.260	57.657	0.87
PMS1674	22.440	23.005	0.98
PMS1724	52.550	53.133	0.99
PMS1807	50.180	34.766	1.44
PMS1907	32.020	34.679	0.92
PMS2007	17.720	20.264	0.87
PMS2107	13.450	20.242	0.66
PMS2202	33.311	26.352	1.26
PMS2324	121.610	137.997	0.88
PMS2402	0.940	0.539	1.74
PMS2502	0.720	0.562	1.28
PMS2624	122.920	227.689	0.54
PMS2708	4.850	0.961	5.05
PMS2809	103.770	0.006	17295.00
PMS2934	0.660	0.414	1.59
PMS3009	0.230	0.006	38.33
PMS3103	0.610	0.398	1.53
PMS3202	4.740	3.923	1.21
PMS3307	2.470	1.959	1.26
PMS3407	39.190	7.774	5.04
PMS3507	5.580	2.587	2.16
PMS3607	156.540	20.077	7.80
PMS3701	4.480	1.621	2.76
PMS3802	4.060	2.874	1.41
PMS3903	6.050	3.864	1.57
PMS4002	9.330	5.505	1.69
PMS4102	76.290	77.764	0.98
PMS4202	118.490	125.039	0.95
PMS4301	110.650	75.569	1.46
PMS4403	1.990	0.739	2.69
PMS4584	219.990	189.081	1.16
PMS4603	18.640	16.939	1.10
PMS4701	0.350	0.077	4.55
PMS4802	0.830	0.880	0.94
PMS4934	0.340	0.050	6.80
PMS5008	0.430	0.168	2.56
PMS5108	98.950	55.419	1.79
PMS5208	0.900	0.917	0.98
PMS5308	0.330	0.029	11.38
PMS5408	2.080	1.697	1.23
PMS5502	1.130	2.180	0.52
PMS5602	207.140	198.685	1.04
PMS5703	585.170	254.545	2.30
PMS5824	18.740	18.194	1.03

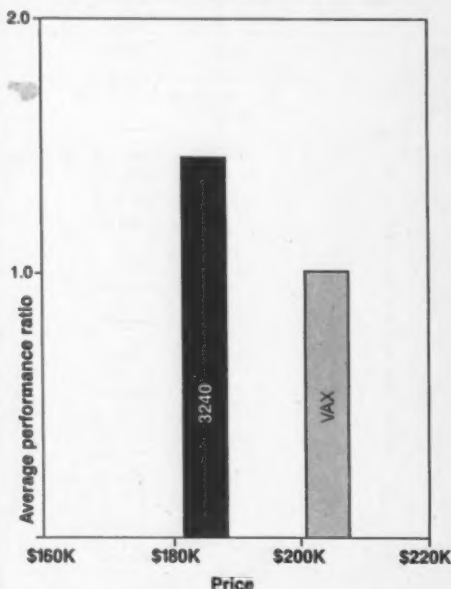
*Performance Ratio = VAX 11/780 CPU time / Perkin-Elmer 3240 CPU time

2. Perkin-Elmer 3240 vs. VAX* Average Time by Job Classification



*VAX is a trademark of Digital Equipment Corporation.

3. Proven Price/Performance



The configurations tested were 2 MB of memory, 67 MB disc, 75 ips tape, Floating Point Processor, CRT terminal, battery backup, and system software. The 3240 had a Writeable Control Store and Fortran Enhancement Package, while the VAX 11/780 had a Floating Point Accelerator.

The Perkin-Elmer 3240 is Faster than VAX.

Our 32-bit Model 3240 performed 44 out of 58 benchmark tasks faster than the more expensive VAX 11/780.

We matched our Model 3240 against the VAX 11/780 in 58 customer supplied benchmarks, comprising 697 million FORTRAN statements.

In 44 of the benchmarks, the 3240 performed *faster* than VAX.

Overall, the 3240 delivered an average 1.4 times higher performance.

Yet the 3240 configuration costs approximately \$20,000 less than its corresponding VAX configuration.

All 58 FORTRAN benchmarks listed in Table 1 were submitted by our customers and prospects reflecting their application needs. Applications that deal with the same kind of problems you face every day.

All benchmarks were run on-site at various locations across the country. And all were run by vendor-trained operators.

In Table 2, we organized the benchmark results into nine common types of job classification, so you can see at a glance how the 3240 stacks up vs. VAX 11/780. (The ninth classification demonstrates the superiority of Perkin-Elmer's system software, in this case globally optimizing FORTRAN VII.)

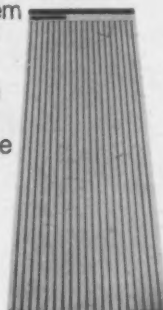
As shown in Table 3, the story is simple and uncomplicated. The

Perkin-Elmer 3240 outperforms VAX 11/780. And it costs less.

The 3240 is faster than VAX in another important way—we can deliver it faster.

We'd be happy to send you a sub-set of those benchmarks which are non-proprietary or have been released with permission, so you can run them yourself. We'll also send you hardware and software documentation.

Before you make a decision on any supermini system, get all the facts on the new 3240 from Perkin-Elmer.



**See us at
NCC Booth 2434.**

The Perkin-Elmer Corporation, Marketing Communications,
2 Crescent Place, Oceanport, NJ 07757

Please send me ☐ complete information on the 3240
☐ documentation ☐ a sub-set of benchmarks.
☐ Have a salesman call.

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PERKIN-ELMER

Multitasking Micro Family Introduced by Cado Systems

TORRANCE, Calif. — Cado Systems Corp. here has announced a multitasking microcomputer-based line of systems that can support up to eight CRT/keyboards and printers.

The Cado 20/20 group includes the 20/22, which supports two devices — typically one CRT/keyboard and one printer; the 20/24 which handles four devices; and the 20/28, which supports eight devices.

CPUs with 32K or 48K bytes control the system. The larger CPU is required if word processing and communications options are selected, a spokesman said.

A choice of three CRT/keyboards and printers, with speeds ranging from

150 char./sec to 300 line/min, is offered.

Peripheral storage is on Shugart Associates, Inc. single- or double-sided floppy disks and Winchester disk drives, with 13.8M bytes available to the user.

Features include a TWX and telex interface and synchronous communications to a number of protocols including the IBM 3270 and 3780.

System prices range from less than \$15,000 for the minimum 20/22 to \$50,000 for a 20/28 with eight devices.

Cado Systems Corp., is located at 2771 Toledo St., Torrance, Calif. 90503.

Micos 85 Extends Business Systems Line

ELMSFORD, N.Y. — Mini-Computer Systems, Inc. has expanded its Micos line of small business minicomputers by introducing an upgraded version of its System 75 machine.

The Micos 85 is software-compatible with the Micos 75, 100, 200 and 300 models. However, the latest machine allows users to add more terminal workstations and mass storage than the low-end computer was designed to handle.

In its basic configuration, the Micos 85 includes a CPU with 64K bytes of memory, a Midas CRT terminal, 32M bytes of disk storage — 16M bytes fixed and 16M bytes removable — a 150 char./sec matrix printer and the Micos operating system. Options in-

clude up to four CRTs, an additional 32M bytes of disk storage and a synchronous communications package that uses the 2780 communications protocol.

The system sells for about \$35,600 from the firm at 399 Fairview Park Drive, Elmsford, N.Y. 10523.

Spur Controller Links IBM Minis To 1403 Printer

LOS ANGELES — Spur Products Corp. has unveiled a controller that allows an IBM Series/1 to be linked to IBM's 1403 printer, nearly doubling the minicomputer's present printer speed capabilities.

With the controller, the Series/1 can take advantage of the 1403's 1,100 line/min printing speed. Currently, the fastest printer available from IBM for the Series/1 operates at 600 line/min, a spokesman said.

Other features of the 1403 include the ability to interchange or replace individual characters and interchange type sets.

While the 1403 is no longer in production, Spur is offering reconditioned models for about \$12,000, less than one-third the price of the same unit from IBM, the spokesman claimed. The controller costs \$20,125.

Spur is located at 1904 Centinela Ave., Los Angeles, Calif. 90025.

Report Studies DP in Business

CHERRY HILL, N.J. — How do small businesses use computers?

An 80-page publication from Management Information Corp. uses case histories to disclose why small businesses implement computer systems, how those businesses operate their systems and what they plan for future upgrades.

Computer installations in a wide variety of businesses are described.

How Small Businesses Use Computers is available for \$18 from Management Information Corp., 140 Barclay Center, Cherry Hill, N.J. 08034.

Dennison Kybe Has Flexible Disks, Cards

WALTHAM, Mass. — Dennison Kybe Corp. has introduced a number of flexible disks and magnetic cards that are said to be rated to handle more than 12 million passes without media-related errors.

The disks and cards were designed to fit virtually every DP or word processing system, including those with specialized initializing formats such as those from Lanier Business Products, Inc. and CPT Corp.

End-user prices for 8-in. flexible disks start at \$2.75. Prices for mini flexible disks start at \$2.60 and IBM-compatible magnetic cards are priced from \$7 per box of 25.

Additional details on the media line can be obtained from the company at 132 Calvary St., Waltham, Mass. 02154.

"We just introduced a new concept in DEC® disk subsystems. It's called competition."

Jim Torson, President

There's nothing like competition to drive down data processing costs. And that's exactly what our new MSC 05/06 does for users of DEC's MASSBUS® minicomputers (Series 10 or 20, PDP®-11, PDP-11/70 and VAX®-11/780). Now you can save up to \$9000 each when you specify our disk drive subsystems instead of DEC's.

RP 05/06 Replacement. Our disk subsystems perform the identical functions that DEC's RP 05/06 subsystems do. In fact, both use the same industry standard disk drive. And the MSC 05/06 is the only non-DEC subsystem totally hardware and software compatible with all MASSBUS computers. Yet the MSC 05/06 costs up to 25% less than the RP 05/06.

We achieved this economy with the same

technology that made us a leading supplier of high density storage devices for OEMs. Today, thousands of systems incorporating IBM, Hewlett-Packard, Data General, Interdata, Microdata and DEC equipment are using our disk subsystems, controllers and intelligent peripherals. Now we extend this economical storage capability to end users of DEC minis, too.

For the competitive edge, phone (408) 733-4200. We're delivering the MSC 05/06 immediately. For more information on how these advanced subsystems can lower your data processing investment, write Microcomputer Systems Corporation, 432 Lakeside Drive, Sunnyvale, California 94086. Or call the number above, ask for our customer support department and get the competitive edge today.

See us at NCC, booth 2745
microcomputer systems corporation

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Two-Phase Marketing Program

HP Launches Trade Show Experiment

By Jeffrey Beeler

CIW West Coast Bureau

PALO ALTO, Calif. — Hewlett-Packard Co. late last month completed the first phase of a two-part experiment designed to test the feasibility of adding yet another dimension to the firm's computer marketing program.

The experiment began on April 29-30 with the opening of an all-HP trade show consisting of about 20 free workshops and seminars supplemented by a product exhibit in which all models of the minicomputer maker's business and technical systems were on display.

Entitled "Productivity '80," the show was organized to stimulate sales of HP's systems and to acquaint users and potential users with the breadth of the company's product line, according to Paul Ely, vice-president and general manager of HP's Computer Product Groups.

The second stage of the experiment will take place late this month when a rerun of the Productivity '80 show comes to Dallas.

Whether the project will end there or receive an indefinite extension remains unclear at this point. A final decision on the matter is unlikely to be made until the results of the first two shows have been analyzed.

Honeywell Drops USISG, Expands Divisions' Role

MINNEAPOLIS — Honeywell, Inc. has restructured its Information Systems unit, eliminating the former U.S. Information Systems Group (USISG) in Waltham, Mass., and the worldwide Product Management Operation based here.

The move was made to shorten reporting lines and to strengthen the line organizations of the Information Systems unit's two principle activities — computer systems and marketing and services.

Instead of reporting to the USISG, Honeywell Information Systems' three major divisions and the International Group based here will now report directly to Stephen G. Jerritts, president and chief operating officer of Honeywell Information Systems.

Jerritts took over the top position in Honeywell's computer operation Feb. 4 when Clarence W. Spangle left Honeywell to become chief operating officer of Memorex Corp. Jerritts has eliminated his old job as vice-president and general manager of the USISG.

Divisions Intact

The three operating divisions of the USISG remain intact under their current managements.

These divisions are the Small Systems and Terminals Division in Billerica, Mass., the Large Information Systems Division in Phoenix and the U.S. Marketing and Services Division in Waltham.

The reorganization places worldwide market and product planning duties within the two systems divisions. These duties were formerly centralized in the Product Management Operation at corporate headquarters.

To support the expanded role of these systems divisions, Honeywell has created two new divisional vice-president positions. Dr. James C. Castle has been appointed vice-president and assistant general manager at the Small Systems and Terminals Division. His counterpart within the Large Information Systems Division is Dewey Manzer.

lyzed.

If the findings look encouraging, however, HP will probably expand the touring-show concept to permit similar events to be held as many as three or four times a year in major market locations throughout the U.S., Ely said.

Sharp Departure

Though hardly HP's first attempt at organizing its own trade shows, Productivity '80 still represents a sharp departure from most of the HP-sponsored events that preceded it.

The mini maker's first foray into the realm of one-company trade shows took place more than a year ago in Detroit, where for the first time under one roof the company displayed its full product line, from laboratory instruments to optoelectronics. Computer equipment accounted for only one part of the total exhibit.

Since then, HP has expanded its trade show and seminar program to include what Ely describes as "rifle-shot" workshops. As their name suggests, rifle-shot workshops are highly specialized customer-education sessions focusing on the features or applications of a single product. In most cases, the sessions are held within one of the company's various sales offices.

PCC Adds Software, Support To Dress Up PCC 2000 System

LOS ANGELES — Pertec Computer Corp. (PCC) is dressing up its PCC 2000 small business system with the addition of a revamped operating system, a full-scale business applications package and an in-house software programming team.

Although the firm has been selling the system through its network of about 95 nonexclusive dealers, until now it did not have a full-blown, general business applications package, according to Soron Litman, manager of small systems for PCC's Systems Marketing Division.

To enhance the PCC 2000's capability, the firm recently obtained worldwide exclusive marketing rights to a general business package from Consolidated Computer Services, Inc. of Atlanta. Called Magic — Managerial Accounting for Generalized Information Control — the package contains seven modules: order entry, accounts receivable, inventory control, accounts payable, payroll, general ledger and financial statements.

"To develop a complete horizontal package like this is too expensive for our dealers," Litman explained. Instead, PCC will now sell the package to its dealers for a

Now, with the advent of Productivity '80, HP is at least temporarily adding a new wrinkle to its existing seminar and trade show program. As an event whose focus is primarily on computer products, Productivity '80 is neither as narrow in scope as the rifle-shot seminars nor as all-inclusive as the conference in Detroit, Ely said.

Bridging the Gap

In its first two installments here and in Dallas, Productivity '80 will stress the theme of integrating business and technical computing. At most user sites, Ely explained, the methods for exchanging data between business and technical computers are inefficient and underdeveloped.

As a result, users in each of the two computing sectors often remain ignorant of the other side's products and capabilities. With Productivity '80, HP hopes to bridge the gap between business and technical computing and make the two sides aware of the other's developments, Ely said.

Based on their experience with previous trade shows, HP officials predict the first two Productivity '80 gatherings will draw 2,000 to 3,000 attendees each. Of that turnout, an estimated 2% to 5% will place product orders on the spot, Ely added.

\$2,000 licensing fee.

The applications offering comes just after PCC enhanced its operating system to include multiple-terminal capability. Called MTX, the new release was completed last month and allows the PCC 2000 to accommodate four additional terminals. Until now the system operated with only one terminal on the host processor.

Basic Four Compatibility

In addition to expanded terminal capability, the operating system is compatible with Basic Four Corp. applications software. PCC sees Basic Four's system as an upgrade to the PCC 2000 and hopes to persuade many of Basic Four's dealers to add the PCC 2000 to their lines.

Litman said that PCC was not trying to compete with Basic Four, but rather offer that firm's dealers a low-end system. Basic Four's systems are priced in the range of \$25,000 and above, whereas PCC's systems cost generally between \$12,000 and \$23,000.

When asked the firm's reaction to PCC's marketing thrust, a Basic Four employee in-

(Continued on Page 50)

Memorex International Planned

SANTA CLARA, Calif. — With international sales now representing 49% of corporate revenues, Memorex Corp. will consolidate on Jan. 1, 1981 all non-U.S. sales and service activities under a new corporate group called Memorex International.

Headquartered in London, the unit will oversee the activities now performed by the company's Europe-Middle East-Africa (Eumea) Group and its Americas and Asia (A&A) Group.

Reto Braun, currently Eumea Group president, will become president of Memorex International. He will report to Memorex Executive Vice-President Charles C. Strauch, who in addition to this position is now act-

ing president of the A&A Group. The Eumea and A&A Groups were formed in 1975.

As part of the reorganization, Memorex appointed three new group vice-presidents effective May 1. Giorgio Ronchi was appointed vice-president of Southern Europe and Latin America, Michael Kelly was named vice-president of Central Europe and Lars Turndal is the new vice-president of Northern Europe, Canada and Australia.

As currently organized, the Eumea Group oversees 14 subsidiaries and employs more than 2,000 people. The A&A Group headquartered here has seven subsidiaries and 500 employees.

COMPUTER INDUSTRY

MDS, Qantel Agree to Merge

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) is poised to enter the small business systems market by acquiring Qantel Corp.

The two firms have reached an agreement in principle whereby Qantel would be merged into Mohawk. Under the terms of the merger, MDS would issue one of its common shares for each 20 shares of Qantel common or common share equivalents.

With about 50 million Qantel shares outstanding, the deal is estimated to be worth about \$36 million.

For its latest nine months ended Jan. 31, MDS reported revenues of about \$156 million. Qantel's revenues for the same period are about \$50 million.

NAS to Market, Support Hitachi Gear

PALO ALTO, Calif. — National Advanced Systems (NAS) has concluded an arrangement with Hitachi, Ltd. to market and support the Japanese firm's line of disk and tape drives.

Although NAS, a unit of National Semiconductor Corp., acquired Intel Corp.'s IBM plug-compatible business last October, NAS has been unable to market Hitachi peripherals. "Hitachi's contract was with Intel, not NAS," a spokesman said.

Since the acquisition, NAS and Hitachi have been working out a new marketing arrangement. Although these arrangements are now final, details on pricing and availability will not be revealed until later this month, NAS said.

These peripherals can operate with either the Hitachi-built AS/7000 fam-

ily of systems or the smaller AS/3000 and 5000 systems manufactured by National Semi.

Hitachi's 7350 disk drives and 7420 tape drives are said to be compatible with IBM's 3350 disk and 3420 tape products. In marketing the products, NAS will emphasize a systems ap-

proach.

While the peripherals arrangement is now concluded, NAS is reportedly negotiating with Hitachi for marketing rights to its AS/8 and AS/9 mainframes, which are said to be more powerful than IBM's current mainframes.

PCC Dresses Up PCC 2000 With Software and Support

(Continued from Page 49)
volved in the firm's dealership program said he had only recently learned of PCC's move and at press time was not at liberty to comment on the situation.

Although programmers are a rare commodity, PCC did not have to hire new programmers for this service. Instead, the software unit is comprised of the applications programmers who joined PCC's staff when it acquired the service and maintenance work of Philips Business Systems, Inc. systems [CW, Jan. 8, 1979.]

Right now only 5% to 10% of these professionals' time is spent on the Philips' product line, Litman said.

While many firms see software services as a means of plumping revenue, for the moment PCC views its software unit as a means of optimizing hardware revenues. "If we break even on software services, we'll be delighted," Litman said.

PCC said it has installed more than 1,000 small business systems to date.

"HP 3000 Users: These new MSC Disk Systems slash your operating costs 3 ways."

Jim Torrance, President, Microcomputer Systems Corporation



Introducing two new disk systems that dramatically reduce the cost of HP3000 ownership. Both systems are command set compatible and software transparent to the HP3000. And both offer a compelling alternative to buying your disk equipment from HP.

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For more detailed reasons, call us at 408-733-4200.

Get the full story on these economical new disk systems by calling the above number and asking for MSC-1690 information. Or write Microcomputer Systems Corporation, 432 Lakeside Drive, Sunnyvale, CA 94086.

Executive Corner

- Finn O. Meiland has been elected vice-president and general manager for General Electric Information Services Co. European marketing and service operation, headquartered in Kingston-Upon-Thames, Surrey, England.

- Charles A. Rossi has been promoted to president of Advanced Board Circuitries, a subsidiary of Documentation, Inc.

- Martin J. Courman and Glenn A. Marshall have been promoted to vice-president of national sales and vice-president of field service, respectively, within Computer Consoles, Inc.'s marketing organization.

- James F. Gillon has been elected vice-president of marketing for Industry Data Services, Inc.

- Tesdata Systems Corp. announced the election of James D. Bowen as president and chief operating officer.

- L. James Beckman has been named senior vice-president in charge of marketing and sales for Business EDP Services, Inc.

- William C. Taylor has been named senior vice-president and executive director of technical operations and international facilities for ITT World Communications, Inc.

- Russell E. Quinn has been appointed senior vice-president of administration for Dataproducts Corp.

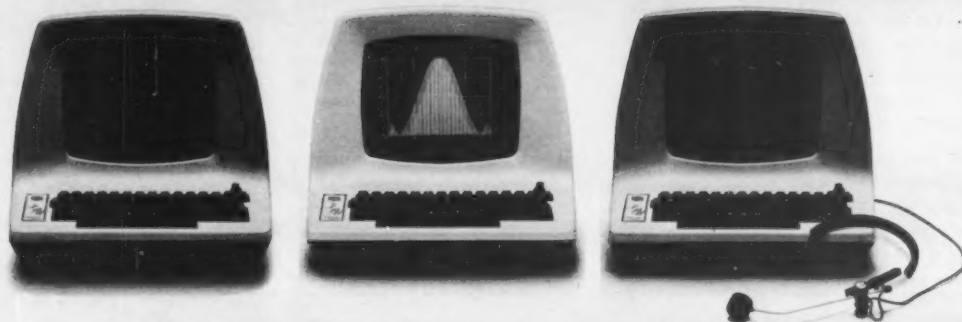
- John Rademaker has been promoted to national sales manager of Agile Corp.

- Memorex Corp. has announced the appointment of James A. Unruh as vice-president of finance.

- The DMW Group, Inc. has announced the appointment of three vice-presidents: Dr. Jack L. DiGiuseppe, John Holland and Alan Lubin.

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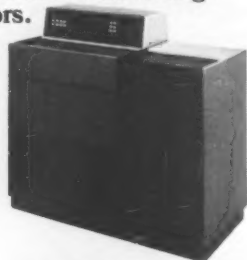
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On Software Services Contract Judge Awards EDS \$19 Million From Iran

By Susan Sanders
Special to CW

DALLAS — A federal judge here recently ruled that Electronic Data Systems Corp. (EDS) should receive nearly \$19 million in damages and attorneys' fees from the government of Iran.

The judgment found in EDS' favor in all the counts of the lawsuit, tried in Dallas in January. EDS claimed Iran failed to fulfill its financial responsibilities related to a contract for software services that established Iran's DP system for national health insurance, social welfare and banking.

U.S. District Judge Robert Porter granted to EDS a judgment for dam-

ages of \$15 million plus nearly \$4 million in prejudgment interest and attorneys' fees in the suit. EDS' suit originally asked for \$23 million.

During the two-week hearing, EDS argued that, after June 1978, Iran's Social Security Organization and Ministry of Health and Welfare had ceased making monthly payments on the three-year, \$41 million contract signed in September 1976. The loss of payments, relocation costs for employees and replacement of damaged equipment amounted to an actual cost of \$20 million, the firm claimed.

EDS also requested several million dollars for unrealized profits, a claim denied by Porter.

Donald L. Case, a Dallas lawyer, represented the government of Iran in the suit. He claimed the contract was procured in an illegal manner with promises to pay the now-deposed Shah Mohammad Reza Pahlavi \$1.5 million.

Case also claimed the Ministry of Health was not a part of the Iranian government, and therefore that government was not liable for the ministry's debts.

Collecting the Money

Porter's ruling, filed May 3, denied Iran's claims and found no "fraud, bribery or public corruption" on the part of EDS.

Although the court last year granted an attachment of \$17 million in Iranian assets frozen in U.S. banks, Porter's ruling did not specify how EDS was to collect its money. EDS anticipates collection difficulties in light of the freeze on assets and the breaking off of U.S. diplomatic relations with Iran, the spokesman said.

The firm plans to return to court to try to secure the release of the money awarded.

The suit, one of many filed by American companies against the government of Iran since last November, is believed to be the first to be tried and ruled upon. Case said no decision has been made to appeal the ruling.

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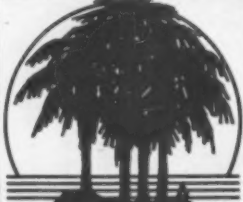
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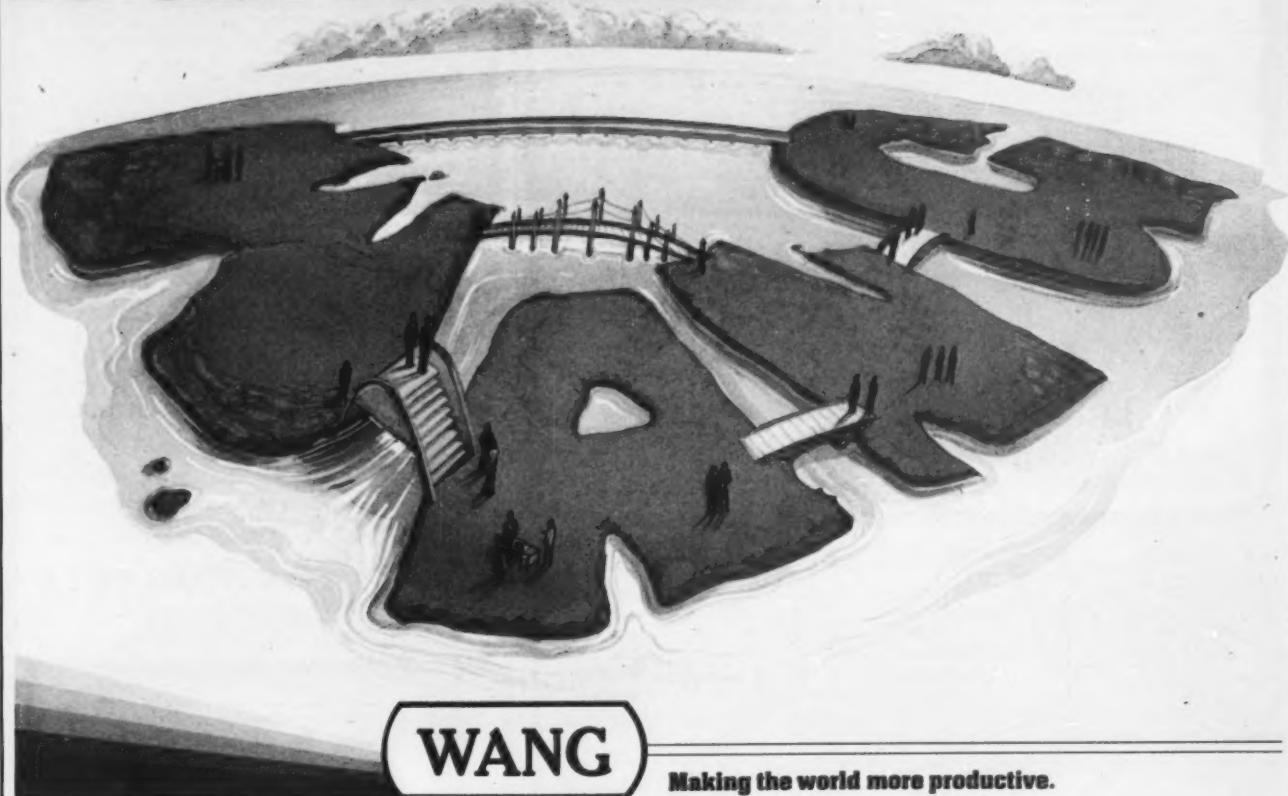
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NEW YORK

COBOL ON-LINE

Convenient location, state-of-art, excellent benefits, push working environment and 4 weeks vacation. 3+ years COBOL programming with either ON-LINE, REAL TIME, TASKMASTER or CICS experience. Needs are for professionals at all levels. Career climbing opportunity. **\$29,000**

RPG II

Fantastic opportunity for up-and-coming professional with this WORLD RENOWNED Fortune Company located in New Jersey. 2+ RPG II programming with SYSTEM 3 or 34 experience. All commercial applications in multi-SYSTEM 34 environment. Very well organized. **\$25,000**

SYS ANALYST

Provide technical guidance during conversion from 370/155 DOS to 3031 OS with this GIANT communications firm. 3+ years COBOL programming experience. CICS experience is a plus, but Co. will train. Unbeatable benefits package. **\$29,000**

BASIC RSTS E

Exciting opportunity with progressive financial services company. 2+ years BASIC programming under RSTS E with strong desire to learn networking. Hardware is DEC 11/70. Constant training. **\$27,000**

CCP SYS 38

Aid in conversion from SYSTEM 31/5D to SYSTEM 38. Heavy RPG II programming with 2+ years CCP experience. Full project responsibilities from design through implementation (Manufacturing applications). Growing rapidly. **\$31,000**

Marty Amato or
Peggy Cooper
ROBERT HALF
of New York
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

MILWAUKEE

TECHNICAL SUPPORT ANALYST

Are you familiar with MVS/OS systems or any large-scale TP network, and looking for a company with a challenging and secure future? Call and discuss your experience with us. **\$25-30,000**

MGR SYSTEMS & PROGRAMMING

Large manufacturer is taking a new direction. Needs an executive to build a new DP installation. Will be selecting both hardware and software. **\$35-45,000**

Dave Weiner or
Stan Mundro
ROBERT HALF
of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

ST. LOUIS

SOFTWARE ANALYST

Will install, maintain and tune vendors supplied applications packages, perform "sys gens" and "table gens". At least 2 yrs. 370/DOS, VS, VSE, COBOL, exp. CICS, DL1, DMS helpful. KEY POSITION! **\$24,000**

PROJECT LEADER ORDER ENTRY SYSTEMS

Must have heavy experience designing, implementing and maintaining ORDER ENTRY systems. Will supervise project team to enhance current systems. EXCELLENT VISIBILITY! **\$30,000**

SR. ANAL/PROG.

At least 5 yrs. mfg. systems design. 370/DOS/VS, CICS, VSAM. Knowledge of all aspects of mfg. applications required: data base, OS/MVS helpful. FINE FORTUNE 500 COMPANIES. To Hi \$20's.

SR. SYSTEMS ANALYST

Large Honeywell shop needs several strong analysts with at least 2 yrs. recent HIS COBOL experience for major conversion project. Mfg. exp. desired. EXCELLENT ADVANCEMENT! **\$26,000**

USER SUPPORT ANALYST

Will coordinate implementation of distributed processing in plants. Background should include IBM Sys. 34 and 370 exp., along with mfg. orientation. Degree preferred. TOP MANAGEMENT VISIBILITY! **\$25,000**

SR. EDP AUDITOR

At least 3 yrs. EDP Audit experience required for major corporation headquartered in St. Louis. Very professional, management supported EDP Audit group. EXCELLENT GROWTH! **\$30,000 (or more)**

DP MANAGER

At least 3 yrs. large IBM Sys. 3, RPG II experience in a mfg. environment required. Supervise 5. OPPORTUNITY TO MOVE INTO MANAGEMENT! **Mid \$20's+**

Charles Shaffer ROBERT HALF of St. Louis 7733 Forsyth Blvd. St. Louis, MO 63105 (314) 727-1535

W. MICHIGAN

PROGRAMMER ANALYST

Senior level, project control exposure, IBM OS 4 plus. Growth shop, low turnover, non-union mfg. **\$25,000**

SENIOR ANALYST

For growing SYS/3-15 shop, CCP, major distributor. Small staff needs leader, mgmt. potential. **\$24,000**

Joe Grabinski
ROBERT HALF
of Western Mich., Inc.
180 N. Division #302
Grand Rapids, MI 49503
(616) 459-2333

MIAMI

PROGRAMMER ANALYST

One of the finest International Fortune 500 companies is currently recruiting COBOL Programmer/Analysts. Your career growth will include training in the latest structured programming techniques with exposure to Data Base concepts. This well known large IBM installation offers an excellent relocation package and a generous benefit program. All-in-all, a terrific opportunity to expand your Data Processing career in a progressive environment in South Florida. **\$25,000**

BANKING ANALYSTS

Our client, one of the leading South Florida financial institutions, is interested in EDP banking professionals. They are currently experiencing a rapid expansion program in their progressive 370/158 installation and have openings at various technical levels. A proficiency in any of several banking software packages including NCP or CPCS will help you to become a member of this aggressive team. This top notch institution offers an extremely liberal benefit package as well as payment of all relocation expenses to qualified applicants. **To High 20's.**

Chuck Nail
ROBERT HALF
of Miami, Inc.
1395 N.W. 167th St.
Suite 100
Miami, FL 33169
(305) 625-6433

ATLANTA

ANALYST/PROGRAMMER

Ground-level positions offering excellent growth opportunity for banking strengths. Responsible for Design, Code, Test, implement and training of users. Requirements: Cobol, strong communication skills; Prefer IBM system 34 but will consider others. **\$25-30,000**

SYSTEMS SUPERVISOR

Outstanding opportunity for person with heavy MVS experience. Other experience desired is: BAL, Total or Environ. Will supervise staff in tech. support area. Excellent relocation package, liberal benefits, suburban location. Very visible position, good growth. **\$30,000**

PROGRAMMER/ANALYST

Atlanta based manufacturing corp. is looking for dynamic, take-charge people to work on new projects. Requirements are: Cobol, Financial and Manuf. applications, OS or DOS, Data Base, and CICS preferred. Good growth opportunity, new "state of the art" hardware on order. **\$22,000**

Ray Jennings
ROBERT HALF
of Atlanta, Inc.
3379 Peachtree Rd. N.E.
Atlanta, GA 30326
(404) 266-5133

PALO ALTO NORTHERN CALIFORNIA

DO YOU HAVE ONE YEARS EXPERIENCE?

Consider one of the many positions currently available in San Francisco/Bay Area.

COBOL PROGRAMMER/ ANALYST

IBM or Burroughs experience in a manufacturing or financial environment. **To \$30,000**

RPG II MANAGERS OR PROG.
System 31/5D or System 32, 34 installations. **To \$30,000**

EDP AUDITORS

IBM OS & DOS environments require EDP Auditors at all levels. **To \$30,000**

SYSTEMS PROGRAMMERS

IBM OS & DOS, needed immediately. **To \$32,000**

DATA BASE ANALYST

Experience with DMS, DL1, ADA-BAS, IDMS or CICS. **To \$32,000**

SOFTWARE MANAGER

IBM 370/OS experience. Supv. small staff. **To \$28,000**

PROJECT LEADER

IBM/UNIVC Banking + Solid project planning/implementation experience. Major conversion. **To \$30,000**

Over 1000 positions in Northern California are currently open. If you have experience in:

Banking
Manufacturing
Retail
Insurance

Client companies pay interview and relocation expenses. Call us collect today.

Rich Abreau or
Jim Dupre
ROBERT HALF
of Northern California, Inc.
2 Palo Alto Sq. #212
Palo Alto, CA 94304
(415) 493-6700

SEATTLE

WASHINGTON firm seeks project leader to take charge of new applications development on Burroughs 1800 system. Prefer 4 years Burroughs online experience in financial/thrift industry. **To \$27,000**

WASHINGTON large IBM 303x CICS shop needs technical support supervisor with 6 years OS/VS software programming experience including 2 years supervision. **To \$30,000**

ALASKA bank needs experienced programmer/analysts with B4700 experience. Prefer 2 years COBOL background. **To \$24,000**

Ray Magill
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue #2626
Seattle, WA 98101
(206) 624-9060

PHOENIX

SENIOR PROGRAMMER

The successful candidate will be very analytical, a self starter who can take initiative and work well in an independent role. Two years COBOL programming on large systems. **Salary \$18,000 to \$25,000**

Roc Rogers
ROBERT HALF
of Phoenix, Inc.
3550 N. Central Ave. #1504
Phoenix, AZ 85012
(602) 264-6488

KANSAS CITY

DOS/VS SOFTWARE PROGRAMMER

Leading edge opportunity for the experienced DOS/VS professional. Person must be capable of doing DOS/VS GEN as well as CICS and DL1 support. Exposure to VM would be a plus. Must be capable of taking complete charge of all DOS/VS software in an installation. Latest program packages are constantly being reviewed and installed. Excellent benefits and paid overtime. **Salary to \$34,000**

SENIOR SYSTEMS ANALYST

State of art MVS shop with major expansion plans for 1980 require a proven Senior Analyst. Person must be capable of interfacing with high level users in the initial systems definition phase and following the complete project through into production. Structure techniques and structured project control with large scale data base and on-line design is required. **Salary to low \$30's**

SYSTEMS PROGRAMMER

Suburban state of the art shop seeks take charge MVS software programmer. Will be responsible for complete MVS support and support of IMS DB/DC. Heavy SVS and communications support experience will be considered. Excellent opportunity for the junior SVS and or MVS technician to move up. **Salary to \$32,000**

STAFF EXPANSION

Rapidly growing property and casualty insurance company is looking for aggressive data processing professionals to assume the following positions in new on-line development.

SENIOR PROGRAMMER/ ANALYST

Position requires 3 years COBOL in an OS/MVS environment, experience with TSO/SPF, and the ability to communicate with users. Previous property and casualty experience is a plus. **Salary to \$28,000**

PROGRAMMER/ANALYST

Qualified individual will have good communication skills, 1 year COBOL programming experience, and exposure to TSO/SPF. **Salary to \$24,000**

D.R. MANAGER

Wanted, System 34 manager who wants to work himself out of DPI Aggressive Johnson County firm offers a career path out of DP for the professional who can help him install their first system 34. Person must possess excellent RPG II skills and the ability to design accounting systems. Upon successful completion of installation of the new system 34 the person will be groomed to become the new controller. Position offers excellent stepping stone into the management team of this fast track company. **Salary to \$25,000**

George Waterman
ROBERT HALF
127 W. 10th
Kansas City, MO 64105
(816) 474-4453

CHICAGO

SYSTEMS PERSON

We need experienced software people! Our client requires at least one year of systems programming in a large IBM shop (OS/MVS/VS1) and ALC. You'll need good communication skills and the ability to present well. Degree not necessary. **Salary to \$28,000**

Amy Nelson
ROBERT HALF
of Chicago
35 E. Wacker Dr.
Chicago, IL 60601
(312) 782-8830

FRESNO NORTHERN CALIFORNIA

SENIOR PROGRAMMER

Combine a career with relaxed lifestyle in California's Central Valley. Our Mediterranean-like climate is an ideal place to raise a family. To be considered for our Fresno client, you should have at least five years COBOL business applications experience. Work as part of a small team tackling interactive problems.

PROGRAMMER/ANALYST

Ready to assume complete responsibility for an information system? Agri-business with small department has ideal opportunity for skilled applications programmer to join management team. Pl. headquarters in shape and then link branch operations through teleprocessing. Small rural agricultural community near hunting and fishing.

EDP CONSULTANT

Initial assignment in Fresno—relocate to Sacramento, California in six months. International organization seeks consultant for heavy client programming and analysis. Mobile, fast-track person strong in mini-computers or modeling/computer simulation preferred.

Cedric Reese
ROBERT HALF
of Northern California, Inc.
1320 East Shaw Suite 160
Fresno, CA 93710
(209) 222-8881

CLEVELAND

SYSTEMS PROGRAMMER ANALYST

Large Ohio Co. seeking candidate with 1-2 yrs. of exp. with HASP or JES2/RJE, CICS and TCAM/TSO, 370 assembler language and be familiar with T/P concepts. Outstanding growth potential. **Salary to \$21,000**

PROGRAMMER ANALYST

Key words IBM Sys. 3 MOD 15D, RPG II, CCP. If you have 3-5 yrs. of exp. then this established, progressive company wants you. They offer a full benefits package, tuition reimbursement and excellent future potential. **Salary \$18-23,000**

Marcy Parker
ROBERT HALF
of Cleveland, Inc.
1630 Euclid Ave.
Cleveland, OH 44115
(216) 621-0670

SAN ANTONIO

PROGRAMMERS

Commercial Business applications. ASAM & COBOL. Must have 2+ yrs. Austin, TX. **\$18-22,000**

SYSTEM PROGRAMMERS

2-3 yrs exp in Sysgen & System maint. OS/VS, DOS/VS. Sunbelt location. Corpus Christi, TX. **\$18-24,000**

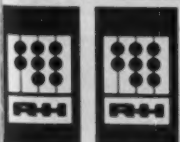
PROGRAMMERS

1 yr level entry position not seen often. OS/VS IBM/370/168, 3033-B1 Data bases. San Antonio, TX. **\$15-18,000**

DP MGR.

Must have degree HW Gen Auto. 1665-Mini. Be the Chief. San Marcos, TX. **\$20,000**

ROBERT HALF
of San Antonio Inc.
First Natl Bk Bldg #340
San Antonio, TX 78201
(512) 736-2467



ROBERT HALF

MINNEAPOLIS/ ST. PAUL

SYSTEMS PROGRAMMERS MVS OR VS

Ideal lg IBM shop has a need for 2 systems pro's. Pref at least 2 yrs exp in IBM OS env., either MVS or VS. Exp in time tuning, VTAM, VSAM, etc. Progressive, moving mgmt team.

Salary to Upper \$20's.

DP MGR. / SYS 34

Mfg concern in small town very near Twin Cities is seeking a strong leader to head up this System 34 shop. Degree required, prefer MBA. Should have at least 1 yr exp w/ RPL on System 34. No coding involved. Competent supporting staff.

Salary to Upper \$20's.

SENIOR SYS/ANAL

Renown Mpls firm w/a fine reputation has super opportunity for qualified analyst. Ideal candidate has lg IBM MVS/IMS exp w/ skills in COBOL, CICS, TSO, mfg and fin'l appl.

Salary to Mid \$20's.

Ron Dykstra
Kathi Grant
ROBERT HALF
2236 IDS Center
Minneapolis, MN 55402
(612) 333-9001

BALTIMORE/ WASHINGTON

COMPUTER PROFESSIONAL

To plan and initiate Data Processing Department for large manufacturer. Selection of hardware and software is yours. Accounting expertise and fluency in German helpful. \$40,000.

Ask for Deborah
ROBERT HALF
of Baltimore
217 The Quadrangle
Baltimore, MD 21210
(301) 323-7770

Ask for Judy
ROBERT HALF
of Washington
7316 Wisconsin Ave.
Washington, DC 20014
(301) 652-1960

TAMPA

Major conglomerate seeking all levels of exp in mfg systems.

\$14-24,000.

Large Financial institution in urgent need of Burr sys/prog - B6700 UP \$25,000.

Int'l co. has openings in both acctg. & mfg. appl. \$21,000.

Major mfr. needs specialist in Order Entry/CICS \$19,000.

Solid engineering co. has need for scientific prog. \$29,000.

Stan Allen
ROBERT HALF
of Tampa, Inc.
1311 North Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

ALBUQUERQUE

IBM LARGE SCALE

Several financial institutions in New Mexico have immediate openings for senior prog/analysts and systems analysts. IBM 370 OS or DOS in COBOL and/or Assembler. CICS and Telescreening. To \$25,000.

IBM SYS 3, 34

Several positions in this area ranging from P/A to Asst. Manager to Director. Extensive knowledge of RPG II, CCP. Salary dependent upon qualifications. \$15-25,000.

Dick Starnes
ROBERT HALF
of New Mexico
P.O. Box 3320
Albuquerque, NM 87196
(505) 884-4557

SAN FRANCISCO

SR. SYSTEMS CONSULTANT

Create a large teleprocessing/data base direction using IBM, MVS and IMS/Fast Path. Need 5 years Assembler and banking expertise. SNA networks, MVS, IMS External, Degree.

TECHNICAL WRITERS

Research, write and produce project documentation, including system description, specifications and ops manuals. Heavy user interface. 2 years experience with broad background in D/P desirable.

EDP AUDITORS

Both operational and financial, focus of project management and controlled development of quality systems. Some COBOL and/or NOMAD preferred, IBM and on-line DB.

SR. SYSTEMS ANALYST

MINI's

Provide for subscribers to perform invoicing, order entry and inventory functions on Mini-Computer installed at site. 2 years COBOL + Mac. Mini language, IBM 370 MVS and solid systems analyst skills needed.

SYSTEMS PROGRAMMERS

Develop hardware configuration, coordinate installation, I/O Genia and control card library updates/acceptance testing of new operation system releases. 370/303X, MVS, SMP/SYSGEN, Peripherals, configuration design.

QUALITY ASSURANCE

ANALYSTS

Develop systems methodologies/procedures for programmers, analysts, operations, etc.

PROJECT LEADERS

Banking. Will design/implement on-line systems, loans, trust, teller systems.

PERFORMANCE

EVALUATION

Capacity planning for large scale IBM installation. 168/303X IMS environment.

Jerry Anderson or

Bob Couch

ROBERT HALF
of Northern California
111 Pine Street
San Francisco, CA 94111
(415) 434-1900

Work where you

want to work.

Severely offices throughout the United States, Canada and Great Britain.

DENVER

MANAGER

Ground floor career opportunity with Denver based energy service co. for a programming manager with a background in online accounting systems. Requires some prior project management experience and working knowledge of COBOL.

Start \$30,000 range.

PROGRAMMER ANALYST

Local division of large multi national conglomerate needs a programmer analyst with manufacturing applications background. Must have COBOL experience and be able to evaluate new packages. Super growth situation. Start \$25,000 range.

There are many other good career opportunities currently available in the Rocky Mt. area. If you are interested in obtaining more information please contact:

Steve Newman
ROBERT HALF
of Denver, Inc.
2 Park Central
Denver, CO 80202
(303) 625-1010

SOUTHERN CALIFORNIA

LOS ANGELES

EDP CONSULTANTS

Plus bonus for major int'l CPA firm with openings in Phoenix, L.A., San Diego & Las Vegas. 4 yr degree & 6+ yrs systems design or consulting experience are needed. Must have a solid, confident, outgoing image.

To \$35,000

Contact Duncan White
ROBERT HALF
of Los Angeles
3600 Wilshire Blvd., Suite 1814
Los Angeles, CA 90010
(213) 386-5825

COMMERCE

PROGRAMMER

Oil company seeks 2+ years COBOL. All financial applications. CICS a plus. Client utilizes IBM 4341 under DOS/VS. To \$28,000.

Contact Bob Dack

ROBERT HALF

of Los Angeles

6252 E. Telegraph Rd.
Commerce, CA 90040
(213) 721-2197

ORANGE COUNTY

PROJECT ANALYST

Financial Applications, heavy user interface. Design distributive DP network. Outgoing person, aggressive, with good business sense for super-charged \$100MM+ multi-plant manufacturer.

To \$35,000

Contact Dave Arkenbrandt

ROBERT HALF

of Orange County

2333 N. Broadway, #200
Santa Ana, CA 92706
(714) 835-4163

DAYTON

INTERNAL CONSULTANT

Mfr. co looking for overachiever to act as internal consultant. You will define systems needs, perform systems design, systems development and implementation. Your mfr. background coupled with exposure to large mainframes and data base is needed. Are you ready to accept this challenge? Salary to \$26,000.

ROBERT HALF

of Dayton, Inc.

One First Nat'l Plaza
Dayton, OH 45402
(513) 242-9600

PORTLAND

PROG/ANALYST(S)

International manufacturer has several excellent opportunities for D.P. professionals with 3-5 yrs. exp. in COBOL on IBM 360/370. Application background must include manufacturing/planning OR marketing/distribution systems. On-line and/or Database preferred.

Salary to \$23,000 DOE.

COMPUTER

SOFTWARE ENGINEER

Min. 1+ yrs. exp. as compiler designer & writer w/ any high level language (ie, PASCAL, ALGOL, LISP), MS in Comp Sci or Engineering preferred.

Salary \$20-\$28,000.

PROG/ANALYST(S)

Major banking firm seeks candidates with 3+ yrs. solid COBOL background for 370/MVS, IMS, & DBDC installation. Prefer experience with loans, payroll, DDA, on-line teller & item processing.

Salary \$24,000 DOE.

Bob Clawson

ROBERT HALF

of Portland

One S.W. Columbia, Suite 850
Portland, OR 97258
(503) 222-9778

BUFFALO

SYSTEMS PROGRAMMER

Large Western NY inc. co. needs min. 3 yrs. systems programming exp. Working knowledge of OS/VS1 internals & IMS SYSGENs a must. Resp. include maintenance & applications support.

Salary \$25,000.

PROGRAMMER ANALYST

Analyst pos. for large national comm'l. bank. Sophisticated on-line NCR shop upgrading & implementing COBOL. Bkgd should include Nat'l-3 & NCR. Career minded analyst will do well in this hi-visibility position.

Salary \$24,000.

MANAGER SYSTEMS & PROG.

Sophisticated on-line CICS install, located in Western NY needs min. 7 yrs. admin. exp. Total resp. for budgeting, staffing, develop. & maintenance of computer ctr. IBM 370 shop running OS/VS1.

Salary \$31,000.

SR. SYSTEMS ANALYST

Project ldr. exp. is necessary to step into this supv. position. Resp. include designing & implementing complex info. systems in the sales and marketing complex areas. CICS, TOTAL, or DL1 are pluses. Top level corp. slot reports to Mgr. Project Development.

Salary \$29,000.

PROJECT LEADER

High potential opportunity to manage project group consisting of prog. & analysts. Resp. for designing & implementing info. systems; i.e. invty. control, BOMP, etc. Client co. requires technical expertise in data base concepts and CICS.

Salary \$29,000.

Pam Siegel

ROBERT HALF

of Buffalo, Inc.

1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 642-9801

PROVIDENCE

SYSTEMS CONSULTANT

Prestigious "Big 8" firm seeks strong track record in design & implementation exp. in mfg., fin'l., or business systems. High visibility for effective communicator.

Salary \$30,000.

D.P. MANAGER

Small mfr. changing from service bureau to Systems 34 in-house, seeks hands on administrator. Must have start up exp. and mgmt. track record. Perfect challenge for D.P. pro.

Salary \$25,000.

SYSTEMS ANALYST

Aggressive So. New England Bank needs an analyst to lead a project team in the design & installation of major fin'l. applications. Leadership skills & ability to communicate effectively with sr. mgmt. is a must. IBM 370 OS COBOL exposure expected.

Salary \$23,000.

SYSTEMS ANALYST

National mfr. seeks broad exposure to the design and systems applicable to a highly complex mfg. environment such as bills of material, scheduling MRP & inventory control. Outstanding opp. for highly motivated & inquisitive indiv. Salary \$25,000.

SYSTEMS PROGRAMMERS

Several openings w/ fast paced R.I. companies. Successful candidates must want state-of-the-art environments. Requires strong comm. skills plus systems prog. exp. DOS/VS OS/VS1 MVS internals IBM shops.

Salary \$25,000.

Dee Ecker

ROBERT HALF

of Providence, Inc.

400 Turks Head Bldg.
Providence, RI 02903
(401) 274-8700

HARTFORD

SR. SYSTEMS ANALYST

Excellent opp'ty. based in VT. Syst. Anal. exp. sought with COBOL bkgd. IBM DOS install. CICS a valuable plus. Low cost of living-rural area.

Salary to \$23,000.

MFG. PROJECT LEADER

Multi-Div. CT shoreline based firm seeks user oriented mfg. systems bkgd. for visible corp. design position. Fin'l. & mfg. apps. Excellent long range potential.

Salary to \$30,000.

SR. SYSTEMS ANALYST

CT opp'ty. for indiv. to direct expansion of retail, merchandising systems for lg. E. Coast client. Exceptional working environment. In suburban location.

Salary to \$28,000.

SR. SYSTEMS ANALYST

CT opp'ty. for indiv. with IBM MVS, VM/370 or CICS internals exp! Excellent suburban location! Environ. provides state-of-the-art software training & growth to tech. mgmt.

Salaries to \$30,000+.

TECH. CONSULTANT

CT multi-div. corp. expanding IBM systems! Indiv. with hardware, software planning, evaluation exp. needed to direct future growth.

Salary to \$30,000+.

T.P. SOFTWARE

CT opp'ty. for indiv. to direct IBM multi-location/div. network utilizing TCAM, VTAM. Extensive Assembler lang. bkgd. req'd. Very professional, unstructured environment.

Salary to \$30,000.

SR. ANALYSTS PROG'S.

CT clients expanding new dev. staffs! Min. 1 yr. exp. in COBOL qualifies for opp'ty. in ins. & mfg. Positions offer recession-proof career with full relocation exp's. paid by employer.

Salaries to \$25,000.

Stan Durbas

Paul Meisner

ROBERT HALF

of Hartford, Inc.

111 Pearl Street
Hartford, CT 06103
(203) 276-7170

LOUISVILLE

VP OF OPERATIONS

Progressive company is seeking to secure an individual who has experience in IBM 370 OS/VS1. Had complete control of operations for Budgets, Hardware acquisition, Project planning and training. All relocation expenses paid and a starting salary of \$40,000.

SYSTEMS PROGRAMMERS

Our client needs assembler programmers with experience in systems design. Your future has great potential for growth. All relocations expenses paid, excellent benefits and a salary to \$26,000.

Tom Williams

ROBERT HALF

of Louisville

880 South Fourth St.
Louisville, KY 40202
(502) 586-1751

BOSTON

OS SYS PROGRAMMER

Expanding nat'l. service org. requires talented pro. for software develop. IBM 370/168 OS-MVS, BAL environment. Will install & upgrade new releases & evaluate new software purchases. Hi-tech challenge with unlimited growth potential. Salary \$32,000 range.

TECH WRITER

Major mini-computer vendor seeks software writer to support new data base product line. Will plan, coordinate & implement new doc. standards. Career opp'ty. with ind. leader.

Salary \$22,000 range.

PL1 PROGRAMMER/ANALYST

Highly respected mfr. requires exp'd. pro. to design, program & implement business systems utilizing PL1 on large IBM system. Unlimited advancement opp'ty. Interv. & reloc. exp. paid.

Salary \$23,000.

MFG. ANALYST/PROG. -N.H.

Progressive nat'l. respected electronics mfr. requires take-chance analyst for major dev. effort. In-depth knowledge of mfg. syst. desired. Rapid advancement offered to aggressive sys. pro.

Salary \$26,000 range.

EDP INSTRUCTOR

Natl' vendor seeks analytic & detail-oriented indiv. to develop & teach software/hardware courses. Must have sys. or apps. prog. & analysis bkgd. or exp. as a technical instructor. Key spot in rapidly expanding dept.

Salary low \$20's.

FORTRAN PROGRAMMER

Prestigious suburban fin'l. services firm seeks aggressive FORTRAN prog. analyst to participate in development of fin'l. data bases & apps. Will work on interactive modeling packages.

Salary \$24,000.

NCR ANALYST/PROG - MAINE

Expanding fin'l. org. seeks tech. pro. for major inhouse devel. & implementation. NCR 8555, NEAT-3 LVL-2, COBOL environ. Hi-visibility growth opp'ty. in desirable location. Reloc. exp. & discounted mortgage rate available.

Salary \$21,000.

Gerry Battista

ROBERT HALF

of Boston, Inc.

100 Summer Street
Boston, MA 02110
(617) 423-1200

NEW ORLEANS

TECHNICAL ANALYST

Multi-Billion \$ fin'l. firm is seeking Ind. with Assembler exp. Telecommunications CICS or IMS helpful.

To \$30,000.

PROGRAMMERS

Opportunity to advance. Challenging work environment. State of the art shop. 2+ yrs. COBOL exp.

To \$24,000.

Jerre Brown

ROBERT HALF

position announcements

position announcements

position announcements

position announcements

position announcements

Hope to See You at NCC!

Anaheim Interviews
May 19, 20, 21
Call collect in advance
Bob Clay (503) 641-3151, ext. 154

During your stay, you might want to stop by our suite and learn first hand who we are (Floating Point Systems) and where we come from (Oregon).

We design, manufacture and market array processors. In fact, you might want to stop by our exhibit at booth number 2452 prior to your interview.

We will be very eager to meet people with experience in these areas:

MARKETING

Positions are available in product marketing. You will be responsible for development and implementation of marketing programs, competitive analysis, development of sales training programs and coordination/development of sales materials. Requirements include technical knowledge in scientific marketplace and sales or systems analysis in the minicomputer or mainframe computer field.

CUSTOMER SERVICE

Opportunities exist for Field Support Software Engineers to provide software support for our field personnel; travel is required. We also need New Products Field Support Engineers for defining criterion imperative for installation, maintenance and training of field support personnel upon product release. Emphasis in FORTRAN and Assembly language plus operating systems.

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Opportunities range from Senior Design Engineers to Associate Power Technicians for the design and development of high speed memory and various arithmetic elements for use with array processors. Experience with TTL, MSI, LSI, microprocessor and/or semiconductor memory elements. Exposure to array processor and/or scientific computer architecture and signal processing a plus.

Software Engineers

Opportunities exist in all areas of software engineering. Program development, operating systems, diagnostic applications, compilers and software quality assurance. Emphasis in FORTRAN and Assembly language required.

Mechanical Engineers

Positions available for mechanical and electro/mechanical engineers. Experience in computer packaging of large and mini mainframe processors and cooling techniques using air movers, convection and reduction cooling.

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Write hardware and software manuals used by customers and company personnel. Requires good writing skills, technical writing experience and a degree in Engineering, Computer Science or equivalent.

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Participate in design and evaluation of future NCR hardware and software products including an interactive processing facility for a large computer system. Requires knowledge of time-sharing system design, operating system architecture, systems organization, performance evaluation and modeling.

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Design and support future operating system software and new Recovery features in support of Transaction Processing/On-line systems. You should have a BSCS, or equivalent, plus 2 years of experience in large scale operating systems utilizing assembly language, or COBOL, PASCAL, or other block-structured languages.

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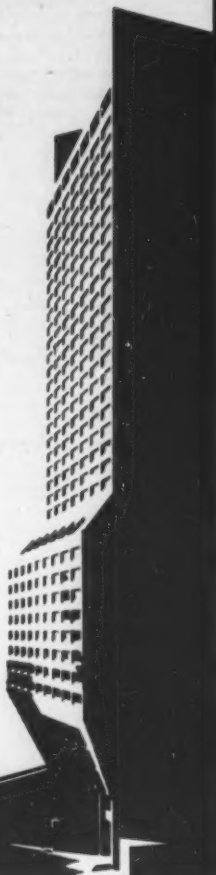
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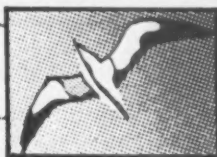
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SYS. SUPER-COBOL/JCL Manual.....\$28K
SYSTEMS PROG.-IBM, TP.....\$29K
SYS. ANAL.-IBM, MRP-mfg.....\$25K
D.P. MGR.-Honeywell, Hospital.....\$25K
PROG. MGR.-NCR, West 111.....\$24K
PROG./ANALYST-
UNIVAC 1100, mfg.....\$24K
OPERATIONS MGR.-
Burroughs, banking.....\$22K
JR. PROGRAMMERS, many.....\$20K
TRAINEES, Math or C.S. Deg.....\$15K

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**SOFTWARE
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Develop software for multiple micro-processor data acquisition systems. Projects include 16-bit upgrade of present 8-bit system, multi-tasking hard disk based operating system, and qualitative analysis software. Experience with some mini or micro computer architecture and assembly language is required. Knowledge of structured programming techniques an asset.

We offer competitive salaries, full line of fringe benefits and state-of-the-art opportunities.

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Computer Sciences Corporation

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The special stimulation of professional cross-fertilization can be a real joy to people whose career paths have tended to limit them to developing software for a particular hardware configuration, or a single line of applications.

It can really get your creative juices flowing!

For sheer variety, sophistication, growth and an environment of professional dynamism, you really ought to look into the biggest array of truly exciting opportunities in the recent history of the CSC Systems Division.

As you can see from the specifications, it's not so much the language you speak, as your fluency.

**THE
LANGUAGES**

COBOL
FORTRAN
HP ASSEMBLER
PL-1
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ASSEMBLER

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HP 1000
HP 3000
HP 21-MX
UNIVAC 1108/1100
H Level 6
PDP 11/70
H-6000
IBM 360/370
TANDEM

THE SYSTEMS

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• GCOS • GMAP • WWMCCS
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**AND A SPECIAL MESSAGE TO
H-6000 SYSTEM PROGRAMMERS**

There are a number of openings at entry, intermediate and senior levels for individuals knowledgeable in all aspects of the Honeywell operating system (GCOS). You will participate in master and slave program development and analysis, and work on site to provide customer assistance with regard to GCOS internals, and to do some occasional teaching. Must have 3 or more years "hands-on" experience in the operational system, an understanding of how GCOS works, programming experience in GMAP plus FORTRAN and/or COBOL, systems background with application programming exposure, knowledge of Honeywell utility packages, and ability to interpret and analyze master and slave mode dumps.

For a prompt response, mail your resume in strict confidence to The Director of Professional Staffing, MC/218-FS.

CSC
SYSTEMS DIVISION
6565 Arlington Boulevard
Falls Church, VA 22046

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Ariz./Calif./Texas

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Prog/Anal/Systems

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DEGREE - \$28,000 - \$32,000
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If you are going to N.C.C....call us for an appointment, or drop by and see us at the Quality Inn, May 19-22.

If you will not be attending...send us your resume, we'd be pleased to hear from you.

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We seek individuals with computer science or electronics training who have the desire to pursue a sales career leading to sales management. You will sell our nationally recognized line of computer graphics systems to new and established customers.

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A proven record in direct sales of mini/micros and a sound understanding of microprocessor technology will qualify you for the Tektronix MDL Sales Team. Due to our rapid growth we can offer qualified individuals the opportunity to be quickly considered for promotion.

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For consideration, contact Kathy Curry, Professional Placement, 3003 Bunker Hill Lane, Santa Clara, CA 95050, or call collect to (408) 496-0800, ext. 104.

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Tektronix
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Headquarters

We are within a two-hour drive of the Cascade Mountains and equally as close to the Pacific Ocean beaches. Our four major plant sites (totaling 1,000 acres) are located in the Portland Metropolitan area...close enough to enjoy the Northwest's rich culture, far enough to get away.

We remain a leader in the electronics industry by developing, manufacturing, and marketing computer graphic and terminal products, microprocessor development systems, and test and measurement products. We want to maintain our excellent reputation and increase new product development. Therefore, we are looking for highly skilled professionals in:

Hardware Design
Software/Firmware Design
Marketing
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A BS, MSEE, CS or the equivalent is required. We offer competitive salaries, profit sharing benefits, relocation and education assistance.

For consideration, please contact Roy Epperson, Corporate Professional Placement, Tektronix, Inc., P.O. Box 500, N-77, Beaverton, OR 97077, or call (800) 547-1164.

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CAREER OPPORTUNITY with small growth-oriented company in beautiful Clear Lake Area (20 miles south of Houston away from the traffic).

Expansion of our current Space Shuttle contract with the IBM Federal Systems Division has created the following openings.

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Prefer degree in Computer Science, Engineering or Math and 6 or more yrs. exp. with IBM 360/370 hardware and Assembly Language. 27-32K

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Send Resume or call collect:
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713-333-3414

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**SYSTEMS DEVELOPMENT
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1840 Nasa Rd. 1, Suite 200
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Need Analyst with 5 years experience in Data Processing. Real time, especially Series 1. Systems design, RPG, and analytical skills required. CCP preferred. Challenging opportunity with growing company located on the Connecticut shoreline. Send resume with salary history in complete confidence to Thomas Costello, General Manager.

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Two Positions

- Minimum 2 years RPG II experience
- CCP On-line a plus
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- Salary range \$15,000-\$18,700 to start
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Room 311, City Hall
215 East State Street
Tranton, New Jersey 08606
AN EQUAL OPPORTUNITY EMPLOYER

COMPUTER SPECIALIST IV (Senior Programmer/Analyst)

The University has two openings for Senior Programmer/Analysts in its Administrative M.I.S. group. Experience in Student Records or Financial application is desired, as is familiarity with data base management and interactive time sharing systems. DCS/Systems-10 exposure is a definite plus. Minimum qualifications include a bachelor's or equivalent plus five years pertinent experience. Salary range: \$16,490 - \$25,650 depending on experience; excellent benefits. **Forward resume by May 19, 1980, to William Conroy, Computer Services, Richards House, University of New Hampshire, Durham, NH 03824. AA/EO.**

PHOENIX

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Senior Programmers

... in our Information Systems area. These positions require 4-8 years business applications programming experience, a thorough knowledge of COBOL, and experience in large-scale computers. A four-year degree and familiarity with UNIVAC 1100 Series preferred. At Sperry, we are involved in sophisticated state-of-the-art applications and challenging work. Take this opportunity to advance your career in a growing organization!

Sperry offers excellent salary and benefits as well as a professional work environment. Send your resume and salary history, in confidence, to Joy Vogelgesang.

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If you are programmed for challenge, join a growth company where state-of-the-art is still being developed - and you can help write the book. TROPICANA offers not only professional challenge and career opportunity, but a choice location on Florida's Suncoast where your family can grow with you.

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The minimum requirements for this position are: three years experience managing the systems and programming staff of a medium to large teleprocessing - oriented DP installation; Bachelor's degree in Public Administration, Business Administration or Computer Science. Additional experience and formal education is desirable. Interested applicants should submit a resume to:

James H. Graves
Departmental Personnel Officer
Data Processing Division
5680 S.W. 87 Avenue
Miami, Florida 33173
(305) 596-8313
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IMS DATA BASE CONSULTANTS —SAN FRANCISCO— To \$36K

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We are consultants to management. For immediate consideration, please call or send resume and salary history, in confidence, to: Gary Schultz, One Sutter St., Suite 1081, San Francisco, CA 94104. (415) 392-3770. Employer Assumes fee.



**COMPUTER PLACEMENT
CONSULTANTS**

CONTROL SYSTEMS ENGINEER

Located just minutes from downtown Denver and within easy driving distance of the Rocky Mountains, Tri-State, a \$550 million dollar electric utility cooperative has an immediate need for a Control Systems Engineer. This position will be involved in the development, testing, integration and maintenance of the software and data base associated with the Energy Management System (SCADA). Qualified candidates should possess a B.S. degree in Computer Science, Electrical Engineering, Mathematics or related field and three years programming experience to include knowledge of real-time systems and FORTRAN. Some travel required.

Tri-State offers a competitive salary, excellent fringe benefits and paid relocation. Interested applicants should submit a resume with salary history to:

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Personnel Dept. CW
P.O. Box 33655
Denver, CO 80233

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(815) 964-0078

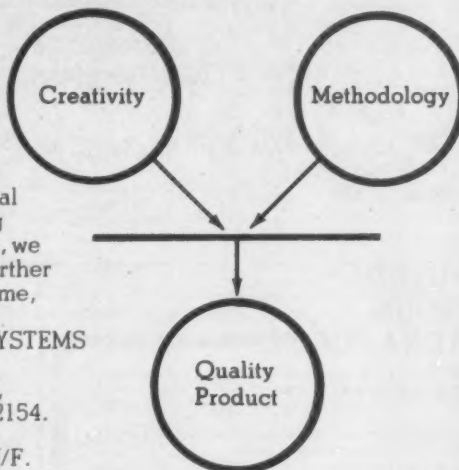
SOFTWARE AT GTE...

Atlantic Operation, in addition to its role as a technology transfer center and a major software/systems development laboratory, is responsible for the design and integration of a family of computer based tools to implement the Corporate Software Development Methodology. Development of these tools offers an unusual challenge to the true professional who is as intrigued with the formal development process as with the end-product of that process. These tools and the methodology which they support provide the necessary order and discipline in the development cycle to create more useful and effective software products.

As a member of this software methodology group, you will be exposed to a variety of operating systems, languages and technical disciplines. Areas of application include applied research, management systems, telecommunications, controls and signal processing.

Atlantic Operation, selected to design and integrate the Corporate Software Development System within GTE, can offer you a unique and rewarding position in this demanding field. If you are an experienced software professional interested in joining our expanding and highly interactive organization, we would like to hear from you. For further information, please send your resume, including salary requirements, to: Barry C. Reikard at: SYLVANIA SYSTEMS GROUP/ATLANTIC OPERATION, GTE PRODUCTS CORPORATION, 100 First Avenue, Waltham, MA 02154.

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Systems

EXECUTIVE DIRECTOR FOR COMPUTER NETWORK

The New Jersey Educational Computer Network (NJECH) is seeking a highly qualified individual to serve as the chief executive officer of the corporation. The NJECH is a cooperative organization of public and private institutions of higher education providing academic and administrative computer services primarily to the educational community. The projected 1980-81 annual budget for the network is about four million dollars. It is desired that applicants for the position possess an advanced degree with a strong background in computer sciences and broad experience in managing computer resources. The network operation is currently located on and near the campus of Rutgers University, New Brunswick. Salary is in the \$40,000 range and is negotiable depending on experience. Inquiries, nominations, and resumes and salary requirements should be sent no later than June 6, 1980 to:

ATTENTION: NJECH SEARCH COMMITTEE
Dr. Seymour C. Hyman, President
The William Paterson College of New Jersey
Wayne, New Jersey 07470

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RSVP SERVICES

Employment Agency for Computer Professionals

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Career opportunities in Europe

BSO/Automation Technology, a major Dutch software house is looking for professionals with a background in technical, scientific or systems software or hardware to join a growing specialist group. We are looking for people seeking a long-term career in a software and systems house environment rather than a short stay abroad. We need systems designers, analysts and

programmers with experience in the design and development of real-time or control systems based on the relevant place of design, development and implementation on mini or micro computers.

For all positions it would be an advantage to have knowledge of any PDP 11, DG Nova or Philips 800. A BSc (Honours) or equivalent is a minimum.

Systems designers
to \$ 36,000
plus car and expenses

In addition to the above general requirements we require: at least 5 years experience in Automation and extensive knowledge of Assembler.

Analysts
to \$ 30,000
plus car and expenses

In addition to the above, we require: at least 3 years experience in Automation, an ability to communicate with hardware engineers, and a good working knowledge of Fortran or Basic and Assembler.

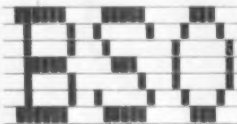
Programmers
to \$ 26,000
plus car and expenses

In addition to the above, we require: experienced and sound programs and design methods, a minimum of 2 years experience and knowledge of Assembler.

The company offers tax free expenses, assistance with medical insurance and a company car covering private use at no cost to the employee. A relocation allowance of \$ 2,500 up to \$ 5,000 depending on family status plus flight to Holland will be provided. Other excellent fringe benefits and almost 5 weeks vacation. Career opportunities to consultant or project management level are available in a growing company. The company is currently busy on a number of different projects using various hardware, including micros.

Applicants to these unique opportunities are requested to send their detailed resumé, preferable with photograph, to BSO/Automation Technology. Interviews are scheduled to be held in San Francisco, Los Angeles, Tulsa and New York from June 2 through 6 1980.

Airmail before May 20, 1980 to:
BSO/Automation Technology b.v.
P.O. Box 3059
3502 GB Utrecht
Netherlands



BSO/Automation Technology b.v.

Koningin Wilhelminalaan 5, P.O. Box 3059, 3502 GB Utrecht.
Phone: 011 - 31 30946746.

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Immediate openings for Field Engineers with IBM 360 CPU, 360 peripherals and plug compatible products.

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This position requires heavy background in Accounting and Inventory Systems and a working knowledge of BASIC plus programming language. Call 926-6061 for an interview appointment or send resume to:

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Work on a variety of software maintenance and development projects for large teleprocessing network.

Applicants must know ALC and have a working knowledge of INTERCOMM. Knowledge of MVS, IBM JCL and Utilities desirable.

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If interested send a resume or letter describing your background to

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EOE M/F

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Vallen Corporation, an aggressive results oriented industrial distributor of safety equipment is searching for a Manager of Systems and Programming. Candidates should possess a college degree, preferably with an emphasis in the data processing field including management, RPG II and COBOL are highly preferred. Candidates should like challenge and be goal oriented. Houston based location plus competitive company paid benefits.

Qualified candidates should call or send a complete resume and salary history to:

Vallen Corporation
c/o Gerald Davis
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Houston, Texas 77061
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(3 positions)

\$23,003 - \$28,230/yr.

HEWLETT-PACKARD 3000 III

The City is seeking quality candidates with cobol experience for the maintenance of current and development of new on-line municipal applications. HP programming experience is very desirable. Work hours available are: 8 hours - 5 days or 10 hours - 4 days per week.

COMPUTER OPERATOR

(1 position)

\$13,955 - \$16,990/yr.

Responsible for the operation of an HP-3000 III Computer including associated peripherals, tape library and Data Processing supplies. HP 3000 operation experience, graduation from operator school and municipal application experience are desirable.

General Information

The City offers excellent growth potential and a comprehensive benefits package including a fully paid State of California retirement plan (no social security deduction). The City offers salary increases through the above range in 5 steps over three years. In addition, there are annual cost of living increases each July.

Filing Date: Open

Send resume or apply:

Personnel Services Office
City of Beverly Hills
450 N. Crescent Drive
Beverly Hills, CA 90210
(213) 550-4837

EDP SUPERVISOR

Continued growth at National Catheter Co., a division of Mallinckrodt, Inc. and an established leader in the manufacture of disposable medical devices, has resulted in an opening for a Supervisor, Data Processing. Reporting to the controller, you will develop and document systems and procedures and be responsible for programming the IBM System 34 computer. Requirements include 2 to 3 years systems development experience and knowledge of RPG-11. MAPICS experience or other manufacturing experience is a plus. Degree preferred.

Located 50 miles Northeast of Albany, N.Y. near the Adirondack/Lake George region, we offer an ideal living environment plus a professional challenge for the creative individual.

Qualified applicants should send resume including salary requirements to: Mr. Peter C. Seipel, Personnel Manager

NATIONAL CATHETER CO.

A Division of Mallinckrodt, Inc.

Argyle, New York 12809

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Local co converting to IMS DB/DC needs the following now:

IMS Data Base Mgr
Develop, implement & manage the DB efforts.
Salary to \$20K

IMS S/A's to \$20K
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ANALYST

Immediate opening for an experienced Programmer/Analyst with minimum 3 Yrs experience. Must have System/3 15-D CCP background. Series 1, 5230 & 5280 training a plus. Applications are Mfg & Accounting. Ideal candidate will be promotable to DP Manager within 6 Mo. Degree desirable. Excellent salary & benefits. References required. Send resume to:

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Director of MIS
P.O. BOX 336
Homerville, Georgia 31634
(912) 487-5341 Ext 157
EOE M/F

PACIFIC NORTHWEST
SENIOR MICROPROCESSOR
ENGINEER

Duties include microprocessor applications development, directing the work of a microprocessor development group, a managing R&D projects. Applications include data acquisition, process control, array processors and robotics. Minimum four years experience in microprocessor applications, a strong hardware background, and BS or MS in EE or Computer Science required.

COMPUTER SYSTEMS
MANAGER

Duties include planning and managing the operation of distributed minicomputer systems in a research laboratory. The position includes directing the work of support staff, long range technical and business planning, acquiring new equipment and associated technical and administrative duties. A degree in Computer Science or Electrical Engineering, two years related experience using DEC minicomputers, and the use of graphics devices are desired. Opportunity for professional advancement is excellent for those having good communication and leadership skills. The positions offer challenging work in a diversified research laboratory environment. Send confidential resume to E.P. Galbraith.

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Pacific Northwest Laboratories
Battelle Boulevard
P.O. Box 999
Richland, Washington 99352

New! 1980
Computer Salary Survey

23 New Categories Reported!
Call for your FREE copy today.

Computer Salaries Soar!

Unprecedented demand and inflation have combined to cause salaries in the computer field to rise sharply in 1980. The new Source EDP 1980 Computer Salary Survey and Career Planning Guide will let you know if your compensation is keeping pace with this growth...and the strategies you can use if it's not.

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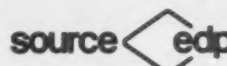
- When you should consider a job change;
- How to make sure you are getting the proper exposure;

Expanded, All New Position
Categories Surveyed

The 1980 Computer Salary Survey has been expanded to provide specific data for twenty-three new categories. These include positions in data communications, mini-micro programming, data base administration, technical marketing support and EDP auditing in addition to our traditional categories of programming, software, systems design, management and computer marketing.

- What steps you must take to break into management;
- How you can avoid career stagnation...and much more.

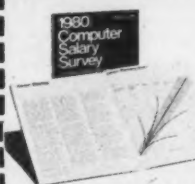
The 1980 Computer Salary Survey has been compiled by Source EDP, North America's largest recruiting firm devoted exclusively to the computer profession.



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(When writing, please be sure to indicate home address and current position title.)

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3. Also desirable to have 2 years experience in programming.

Send Resume to: Occupational Dean; West Shore Community College; P.O. Box 277; Scottville, MI 49854. We are an equal opportunity employer.

"PROGRAMMER/ANALYST" — Individual should have two years experience in systems analysis and programming in COBOL on a large IBM mainframe. Individual responsible for maintaining current programs and implementing new systems. Additional responsibilities include assisting in developing standards and procedures and maintaining the operating systems software for on site Data General mini-computer.

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Will evaluate corporate systems and determine areas which would be better supported by existing or new computer applications. Bachelor's degree and 6 years analysis experience required. Must have COBOL background and supervisory experience. Effective communications skills needed for heavy user interface.

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Bachelor's degree (or equivalent) and 3 years COBOL programming and analysis experience with a system using IBM CS/VS or MVS is required. Background in TSO, DYL 260, or VSAM is helpful. Advancement opportunities available.

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Bachelor's degree in Engineering and 2 years experience in solving engineering problems. FORTRAN and IBM 370 experience are required.

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Support positions require two years DP experience in a 360/370/303X-DOS, VS1 or MVS environment. Programming skills may be either in BAL or COBOL; IBM/JCL (OS or DOS) is a must. Candidates for support positions must possess good communicative skills. Experience in data base, TP monitors, and/or structured programming desirable but not required.

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Mr. E. Smith, Personnel Director

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Applications are invited for a post of Senior Computer Officer II in the Computer Centre with responsibility for computer applications in the University's administration. Applicants should be university graduates with at least five years' experience in the development of computer-based systems.

Annual salary (superannuable) is: HK\$64,600 x 4,740 - 117,720; 1 pound = HK\$10.95 approx. Starting salary will depend on qualifications and experience.

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Further particulars and application forms may be obtained from the Association of Commonwealth Universities (Acpts), 36 Gordon Square, London WC1H 0PF, or from the Recruitment Section, Secretary's Office, University of Hong Kong, Hong Kong.

The closing date for applications is 15 June 1980.

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If you can't call, please send your resume and salary history in confidence to: Bo Beal, TSC/DDC Personnel, Digital Equipment Corporation, 301 Rockrimmon Blvd. So., Colorado Springs, CO 80919.

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Personnel Payroll and Benefits System

The Louisiana Land and Exploration Company is in need of a Senior Programmer Analyst to serve as Project Leader for the installation of a new Personnel Payroll and Benefits System.

Requirements include a BS degree, knowledge of COBOL and CICS, and heavy exposure to a Data Base and Data Communications environment.

Join a dynamic and aggressive independent oil and gas company with a commitment to seek top professional talent to support massive expansion in the Information Systems Department.

Excellent compensation and benefits package. Please send resume to:

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Here's a perfect opportunity to broaden your systems design expertise. The primary responsibility of this challenging position will be new systems design. Your familiarity with general business applications will enable you to play a major role in Stepan's business systems development plan. To qualify you need a minimum of 3-5 years data processing experience. Experience with on-line system and teleprocessing are helpful. Systems project management experience and the ability to communicate effectively with "user" management is essential.

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Primary responsibilities include: programming, testing, and documenting new programs for both batch and on-line applications. You must have at least 3 years of COBOL programming experience in financial and manufacturing systems to qualify.

Your expertise will be rewarded with an excellent salary and comprehensive benefits package that includes profit sharing, life, medical, dental insurance, incentive bonus and more! For immediate confidential consideration, send your resume with salary requirements to:

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Dr. Alton R. Goddard, Head
Department of Computer Science
East Texas State University
Commerce, Texas 75428
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We are seeking an individual with experience in the retail industry for large scale projects from initial design through final installation.

Your initial project will be the development of a point of sale system utilizing IBM's newly announced 3680 POS terminals. It will involve developing applications for both the 3680 as well as our large scale host system.

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You will work in a dynamic environment with an impressive assemblage of respected engineers, marketing and computer professionals, and their counterparts at Bell Laboratories, Western Electric, and other Bell System companies. Your projects will be supported by widely-based resources that enable you to advance to the forward reaches of your specialty. You will also enjoy the pride and prestige in being part of the pacesetter organization in U.S. and world communications.

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Involves analysis, development of design specifications and computer algorithms, data base architecture, implementation and analysis of results (including cost-benefit) for many areas of our business. You will carry overall project management responsibility during the system's life cycle. Appropriate background includes an advanced degree in Computer Science, Statistics, Operations Research, Industrial Engineering, and/or applicable experience with systems analysis/design, and excellent written and oral communication skills.

Current projects include work in the following areas:

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There are many areas in which to apply academic background in data processing and/or your 2+ years of experience.

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- Data dictionary software
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- Statistical packages
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**This could be the job
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In this key job supporting major Aramco projects, we require process computer software engineers with BS degrees in engineering, math or computer sciences, and 3 or more years' experience in various real-time processes or SCADA projects.

We also need process engineers with BS degrees in chemical engineering, and 3 or more years' experience in designing and maintaining process computer and instrumentation systems.

Process computer hardware systems engineers are needed with BS degrees in electrical engineering, computer science or engineering technology, plus 3 or more years' experience in designing and maintaining process computer and instrumentation systems.

You'll be based in Houston, but from time to time you will be required to travel to vendors in the U.S. and to field sites in Saudi Arabia.

Interested? Send us your resume and we'll get back to you very soon. Write: Aramco Services Company, Section DOM, Dept. CW051280/JLSA, 1100 Milam Building, Houston, Texas 77002.

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The position requires 3 plus years of IBM Systems experience. CICS, DL/1 and VSM experience would be helpful, with 1 plus years in a supervisory capacity. Degree preferred although equivalent experience considered. Exposure in mining and accounting applications required. Will be responsible for the design, development, maintenance and implementation of all software systems.

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AA/EEO

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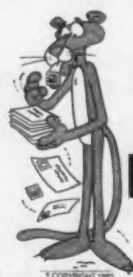
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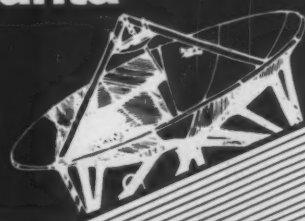
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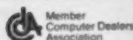
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